ORDER NO. VRD8611148

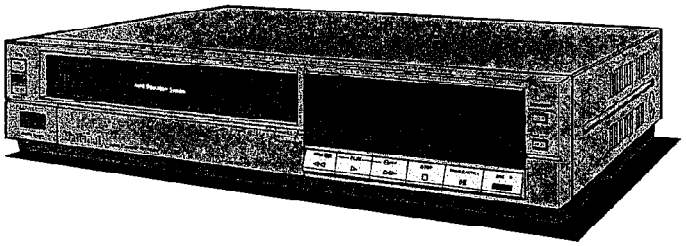
Service Manual

General Description
Adjustment Procedures
Block/Schematic Diagrams
Exploded Views/Parts List

Video Cassette Recorder

National VHS HQ PAL

NV-G20 EN A EA



SPECIFICATIONS

ITEM	SPECIFICATION	ITEM	SPECIFICATION
POWER	SOURCE: 110~240 V AC 50/60 Hz (NV-G20EN) 240 V AC 50/60 Hz (NV-G20A) 230 V AC 50/60 Hz (NV-G20EA)	VIDEO	INPUT: VIDEO IN CONNECTOR (PHONO) 1.0 Vp-p, 75Ω terminated
	CONSUMPTION: 22 watts		OUTPUT: VIDEO OUT CONNECTOR (PHONO) 1.0 Vp-p, 75Ω terminated
RECORDING SYSTEM	2 rotary heads, helical scanning system	AUDIO	HEAD: 1 Stationary head
	PAL		INPUT: AUDIO IN CONNECTOR (Phono type) More than −10 dBV (316 mV), 50 kΩ
TV TUNER SYSTEM	VHF I: CH2~CH4 (PAL B) VHF III: CH5~CH12 (PAL B) 75Ω unbalanced (NV-G20EN) VHF I: CH0~CH5 (PAL B) VHF III: CH5A~CH11 (PAL B) 75Ω unbalanced (NV-G20A) VHF I: CH1~CH3 (PAL B) CH4~CH11 (PAL B) 75Ω unbalanced (NV-G20EA) UHF: CH21~CH69 (PAL G) 75Ω unbalanced (NV-G20EN/A/EA)		OUTPUT: AUDIO OUT CONNECTOR (Phono type) −8 dBV (400 mV), less than 1 kΩ
		TAPE FORMAT	VHS Cassette tape (Tape width 12.7 mm)
		TAPE SPEED	23.39 mm/s Record/Playback Time: 4 hours with 240 min. type tape FF/REW Time 5.5 min. with 180 min. type tape
		DIMENSIONS	380(W) × 82(H) × 345.5(D) mm
RF OUT SYSTEM	VHF: CH3/4 76±3 dBμ 75Ω unbalanced PAL B (NV-G20EN) VHF: CH0/1 76±3 dBμ 75Ω unbalanced PAL B (NV-G20A) VHF: CH2/3 76±3 dBμ 75Ω unbalanced PAL B (NV-G20EA)	WEIGHT	5.1 kg
		STANDARD ACCESSORIES	1 pc. DIN-RF Cable 1 pc. Wireless Remote Controller 1 pc. Video Cassette Tape (NV-G20A/EA)
VIDEO	HEADS: 4 rotary heads 1 pair for recording and play back (L-R heads) 1 pair for video trick play with L′ and R′ heads (field still and fine slow)		

Weight and dimensions shown are approximate.
Specifications are subject to change without notice.

National

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C-3-7

T24

INTRODUCTION

This service manual contains technical information which will allow service technicians to understand and service this model.
Section 1 presents you with some general information of features and controls, enabling you to become familiar with each function.
Section 2 contributes to your mechanical and electrical adjustment as well disassembly and replacement procedures.
In the case of very common information relating to other models like mechanical adjustments, please refer to each service manual.
Section 3 contains block diagrams which offers you information for checking and understanding each circuit. Schematic diagrams which give you detailed information such as waveforms, voltage data, function e.t.c...
Section 4 contains exploded views and parts list.
Please place orders using the parts list and not the drawing reference numbers.
If the circuit is changed or modified, this information will be followed by supplementary service manual to be filed with original service manual.

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Technical Information

Subject: New Mechanism (G-Mechanism) And How To Make Easier Servicing.

1. New Mechanism (G-Mechanism)

Thanks to the innovation of technology for the basis of the creation of new generation,the G-Mechanism offers the following major advantages.

(1) Low-Profile DD Cylinder Motor (LDD Cylinder).

The G-Mechanism employs an oil Film Suspension System for the DD Cylinder Motor which called the Low-Profile DD Cylinder Motor with "Hidro Dynamic Bearing".
The LDD Cylinder compared with the usual ball bearing system, reduces bearing distance, thereby enabling thinner dimensions. This also overcomes friction problems, so the 99.999% rotational precision of the DD motor can be transferred to the cylinder.

(2) Lap Time Indicator

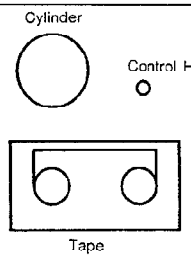
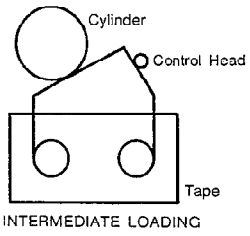
A vast improvement over the approximate counter systems of conventional VTRs, the Lap Time Indicator gives you an exact reading of elapsed tape time in hours, minutes and seconds. This is extremely useful for indexing particular portions of the tape during playback and controlling the length of recording time. This Lap Time Indicator System owe into success to the Intermediate Loading System.

(3) Compact Mechanism

The Model of G-Mechanism is its attractively slim appearance by innovation of Compact Mechanism. The front panel is only 82mm high, just right for an audio rack.

(4) Comparison Chart

Note:
The Capatan Motor of G-Mechanism workes as a loading motor and a front Loading motor in the conventional mechanizm. This capstan motor controls all mechanical components of G-Mechanism VTR.

MECHANISM / ITEMS	Current Mechanism (D1)	New Mechanism (G)
Tape Transportation at FF/REW Mode		 INTERMEDIATE LOADING
Lap Time Countor (Houp, Min., Sec.)	×	○
LDD Cylinder	×	○
Capstan Motor	○	○
Front Loading Motor	○	×
Loading Motor	○	×
Height	73mm	53mm
Size	100%	87%
Model Size (mm)	(NV-G10) 380(W) × 99(H) × 353(D)	(NV-G20) 380(W) × 82(H) × 345.5(D)

2. The Phase of G-Mechanism

The phase of mechanical condition becomes very important. Pay much more attention to the phase of mechanism, when reinstall any components of mechanism, refer to the item of 2-1 Disassmbly Procedures and the item of 2-3 Mechanical Adjustment Procedures, even if installation of the Cassette Compartment , mechanical adjustment (alignment) should be performed.
The mechanical movement shows the flow chart from the drive source of capstan motor to all other main mechanical components.

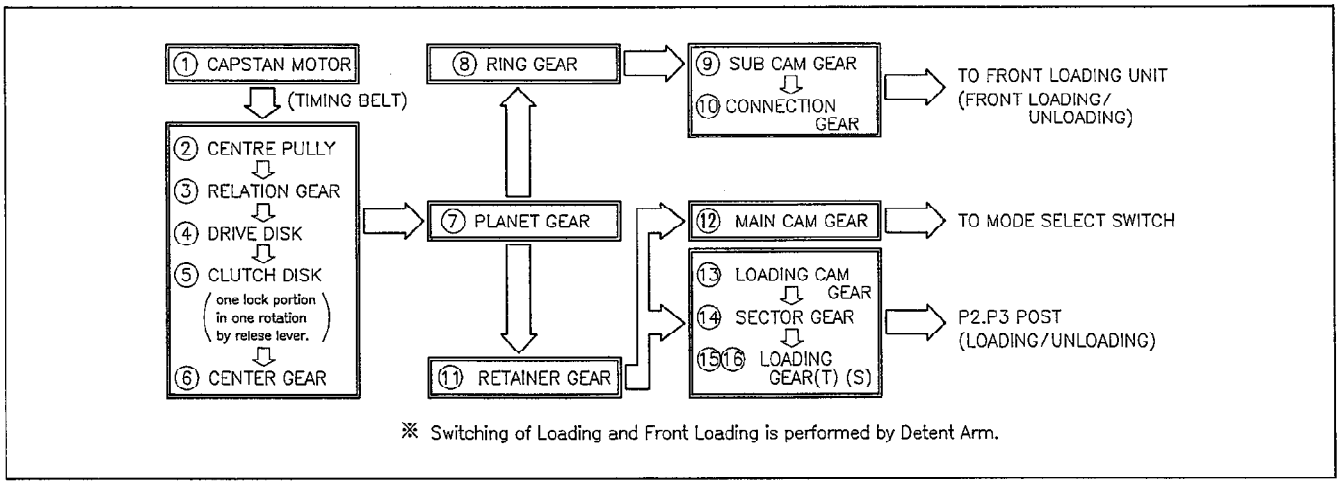

① CAPSTAN MOTOR
(TIMING BELT)
② CENTRE PULLY
③ RELATION GEAR
④ DRIVE DISK
⑤ CLUTCH DISK
one lock portion in one rotation by relese lever.
⑥ CENTER GEAR
⑧ RING GEAR
⑦ PLANET GEAR
⑪ RETAINER GEAR
⑨ SUB CAM GEAR
⑩ CONNECTION GEAR
TO FRONT LOADING UNIT (FRONT LOADING/ UNLOADING)
⑫ MAIN CAM GEAR
TO MODE SELECT SWITCH
⑬ LOADING CAM GEAR
⑭ SECTOR GEAR
⑮⑯ LOADING GEAR(T) (S)
P2.P3 POST (LOADING/UNLOADING)
※ Switching of Loading and Front Loading is performed by Detent Arm.

Fig. 1 Flow Chart For Mechanism Movement

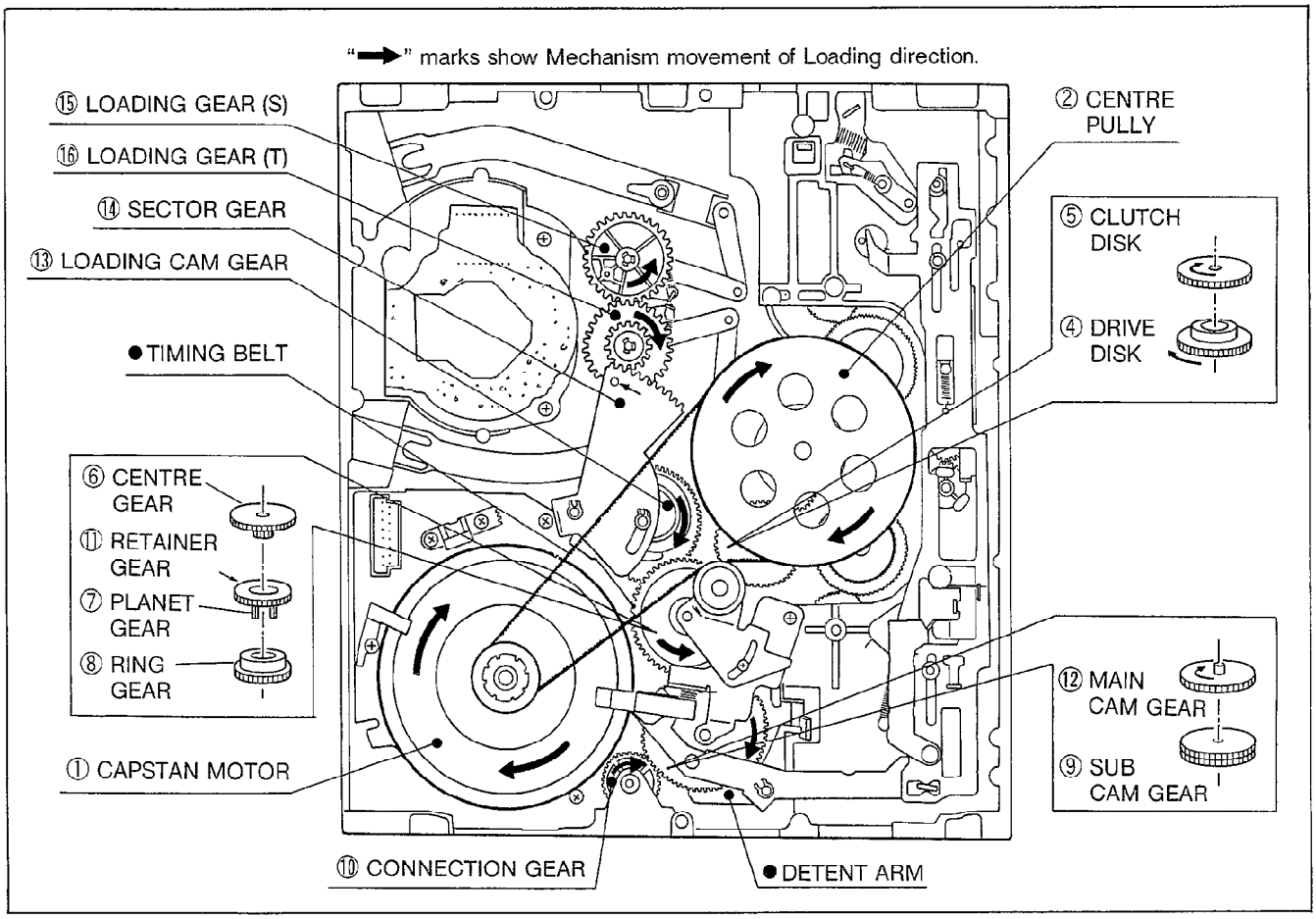


Fig. 2 Bottom View of Mechanism

3 How To Eject Manually

If the electrical circuit is defective and the action of unloading and front unloading don't work properly, it is possible to eject manually as follows.

(1) Take out the Main AC.

(2) Release the Change Lever by pushing it to arrow mark direction as shown in Fig. 3.
(3) Turn the capstan motor to counter clockwise slowly until the Clutch Disk is locked. (Clutch Disk is locked once in one rotation)
(4) Release the Change Lever again when the Cluch Disk is locked.
(5) Repeat the (2) and (3) until cassette is ejected.

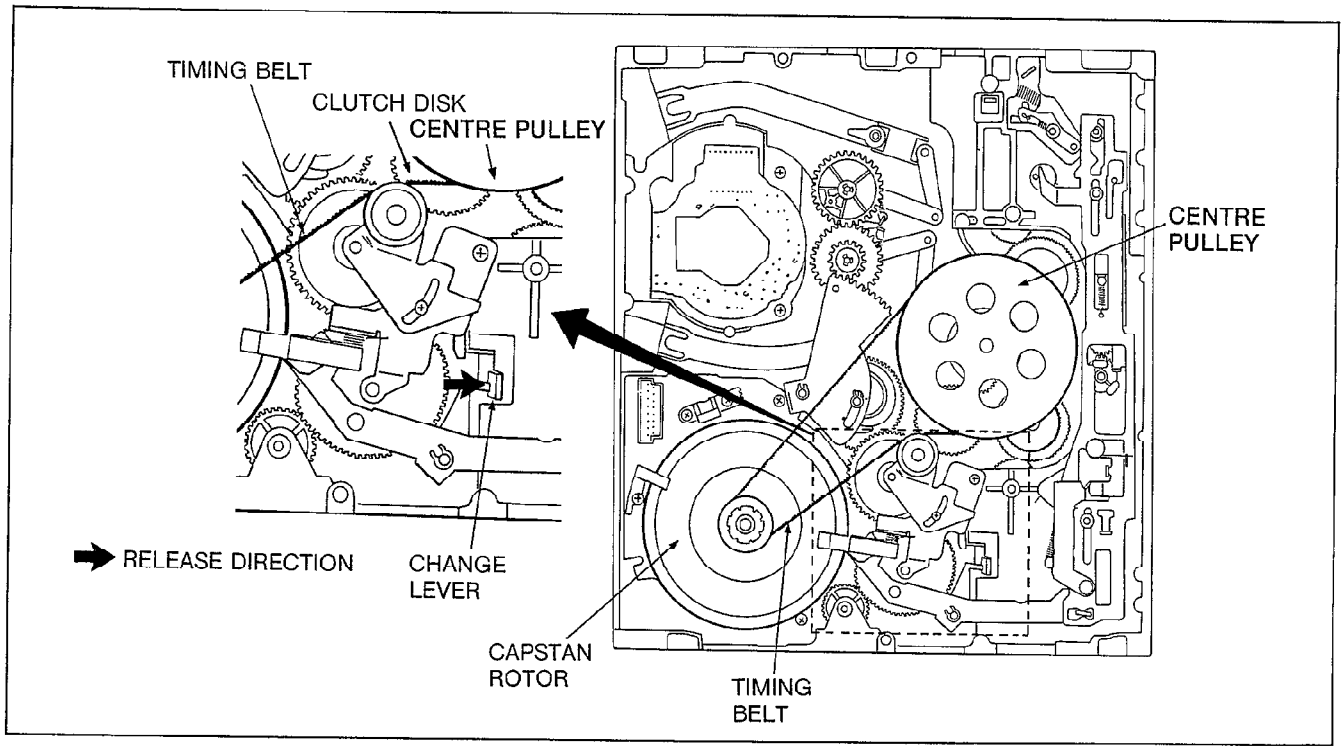


Fig. 3

4. How To Make Easier Servicing of A Packed Circuit

In case of the packed circuit such as Luminance/Chrominance, Servo, CH select and so on, you may check easily by standing Main C.B.A as shown in Fig. 4.

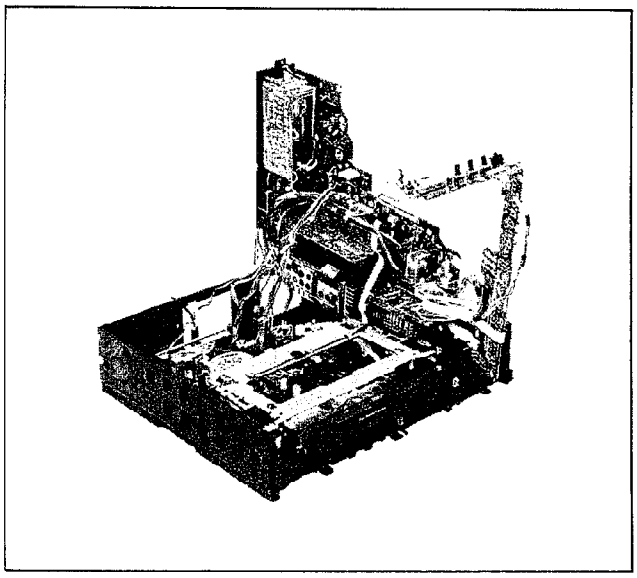


Fig. 4

5. How To Check or Replace The Timer Circuit

When checking or replacing the Timer circuit, the following steps should be followed to protect this circuit.

(1) Disconnect the AC mains.
(2) Make a short circuit at C7518 by connecting a wire to both lead wires of the C7518.
(3) Check or replace the parts.
(4) After checking or replacing the parts, remove the short circuit from C7518.

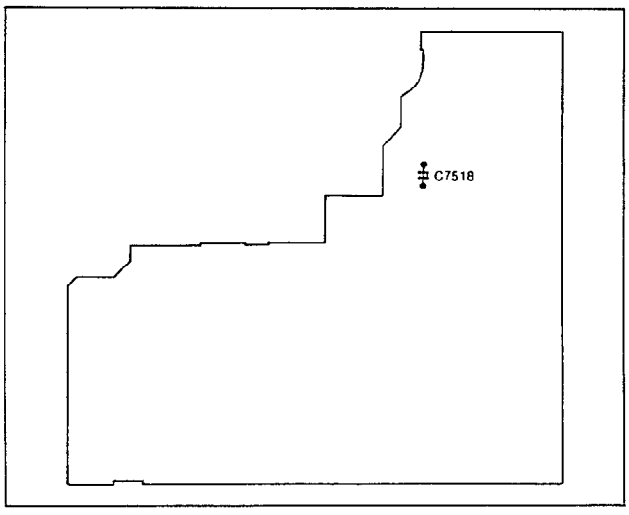


Fig. 5

6. How To Use The Upper Cylinder Remover

The newly developped Upper Cylinder Remover is useful to remove the Upper Cylinder easily ,especially when it is too hard to remove by hand.

1). Remove 2 screws (A) , then unsolder the soldered portions indicated by arrows as shown in Fig.6.
2). Set the screws of Upper Cylinder Remover into holes (B) , then tighten the screws of Upper Cylinder Remover fully.
3). Turn the handle of Upper Cylinder Remover clockwise holding the Upper Cylinder firmly until it is removed. (Upper Cylinder is lifted up gradually during turning the handle).

Note:
1. This Upper Cylinder Remover also can be used for other conventional VHS Video Head Cylinder.
2. Work with extreme care when removing or replacing the Upper Cylinder unit .
   Do not touch video head during servicing.

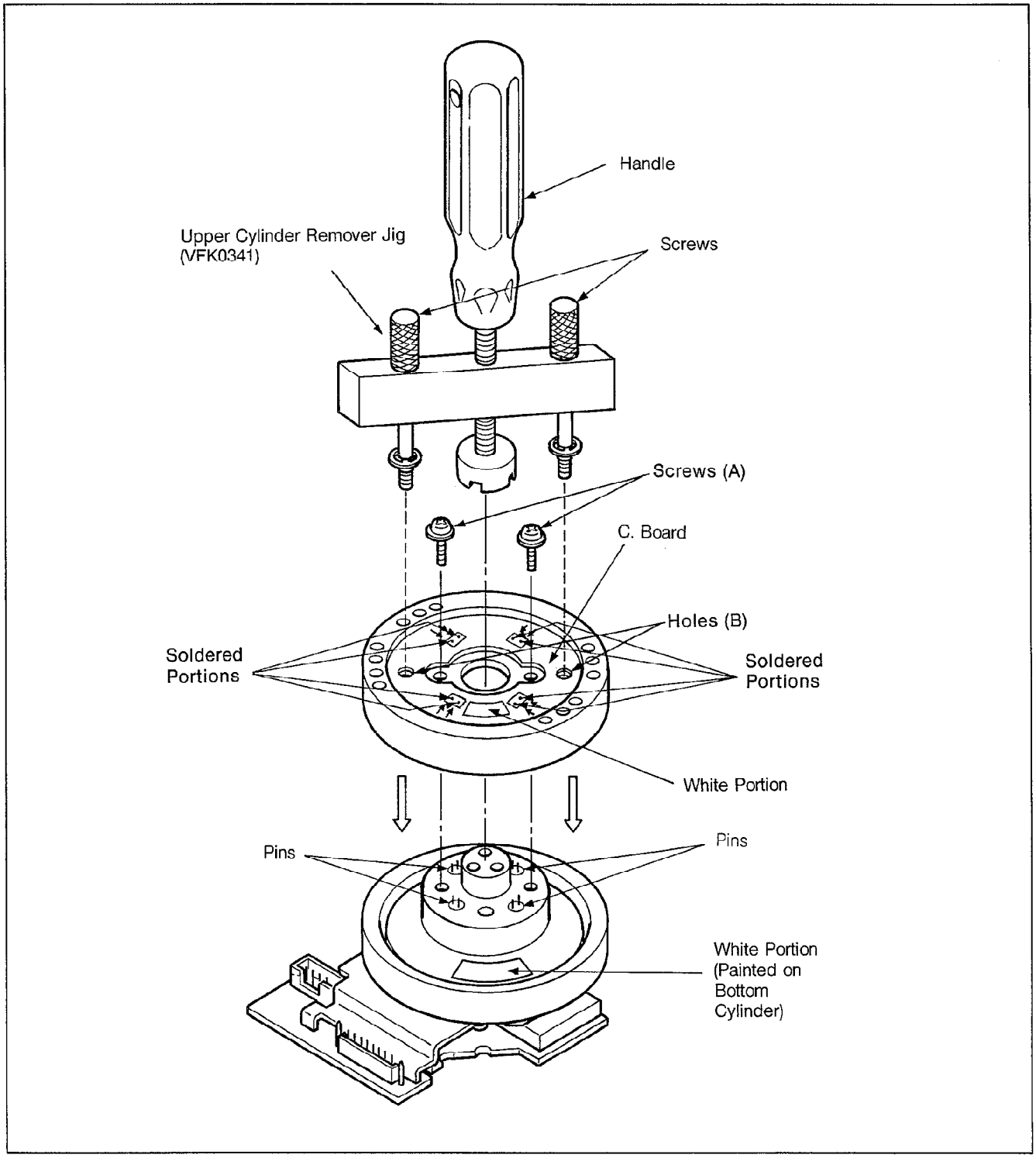


Fig. 6 Upper Cylinder Remover (VFK0341)

SECTION 1
GENERAL DESCRIPTIONS

1-1. FEATURES

1. Slim Design and Front Loading System

This highly functional design allows loading the video cassette from the front, thus minimizing the space required for the placement.

2. Multi-Function Display

Whenever an operation button is pressed, the activated function is immediately indicated on this easy-to-see display. It shows you at a glance, in what operation mode the VTR is functioning.

3. Infra-red Remote Controller

The Infra-red Remote Controller unit allows operation of various functions from the comfort of your favourite viewing position.

4. Picture Sharpness Control

With this control, the contours of the playback picture can be made sharper or softer.

5. Super Still, Super Still Advance and Super Fine Slow Playback.

Slow Playback.
Super Still, Super Still Advance and Super Fine Slow Playback are possible with superb picture quality with minimum noise and jitter.

6. Super OTR Function (One-Touch Timer Recording)

This convenient function makes it possible to easily programme the VTR for recording of TV programmes with immediate start or with start within 24 hours and with the starting time and ending time precisely to the minute, and the VTR will automatically turn itself off when the recording ends.

7. Auto Voltage Selector

This video recorder is equipped with automatic voltage control. It can ,therefore,be used wherever the local voltage is between 110–240 V, without any manual voltage adjustment.

8. Auto Operation

This VTR automatically turns itself on when a video cassette is inserted even if it was turned off. When the tab of the inserted cassette is broken out, playback will start automatically. Also, even if the VTR is off, when the Eject Button is pressed, it automatically turns itself to eject the cassette tape and turns itself off again.
When a video cassette tape with a broken out tab is inserted and the VTR is switched over to recording, OTR and timer recording, the cassette tape will be automatically ejected.
When the tape reaches its end (except during OTR and timer recording), it will automatically rewind to the beginning.

9. 1-Month Calendar Timer

The clock/timer of the NV-G20 is programmed with the calendar up to the end of 2001. Therefore it knows exactly what day of the week it is on any given date. Programming of as many as 8 timer recordings is possible up to one month in advance.
In addition, easy programming of the timer recordings is possible both on the VTR itself and via the remote control unit.

10. Real Time Counter

The new Real Time Counter is a great improvement over the approximate counter systems of conventional VTRs. It gives you an exact reading of the elapsed tape time in hours, minutes and seconds, and makes it easy to calculate the tape time left on a cassette.

11. Reception of up to 16 TV Stations

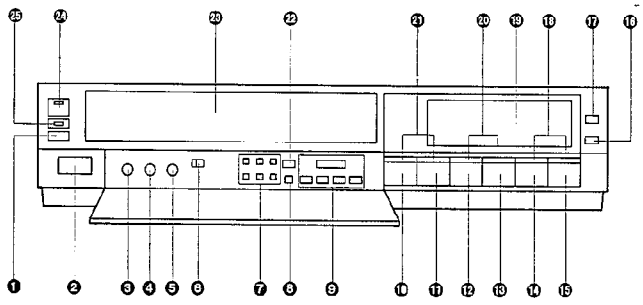
The built-in tuner is this video recorder allows pretuning of 16 TV stations. So this VTR can accommodate virtually any increase in available TV programmes in the future.

12. HQ (High Quality) Picture System

Video recorders carrying the HQ symbol mark feature the new VHS High Quality Picture System. This system assures complete compatibility with VTRs that use the conventional VHS system.

1-2. CONTROLS AND COMPONENTS

FRONT



1. **Eject Button (▲)**

2. **Infra-red Remote Control Receiver**

3. **Tracking Control**

   Tapes recorded on another machine may show noisy or a streaky playback picture,rotate this control slowly in either direction until the picture is clear.
   The control should normally be kept in the "FIX" position.

4. **Slow Tracking Control**

   When noise bars appear during Field still, Field Advance of Field Fine Slow playback, switch over to slow playback and turn the slow tracking control to the clockwise or counter clockwise to reduce the noise bars.
   Then resume the required mode.
   It may not be possible to eliminate the noise bars completely.

5. **Picture Sharpness Control**

   With this control, the contours of the playback picture can be made sharper or softer.

6. **Edit Switch**

   Set this switch to "ON" When you make dubbing (copying).
   Set this switch to "OFF" when normal use.

7. **Tuner Set-up Controls**

8. **Clock Button**

9. **Timer Controls**

10. **Rewind ◀◀/Review ⏪ Button**

11. **Play Button (▶)**

12. **Fast Forward ▶▶/Cue ⏩ Button**

13. **Stop Button (■)**

14. **Pause/Still Button (❚❚)**

15. **Record Button (●)**

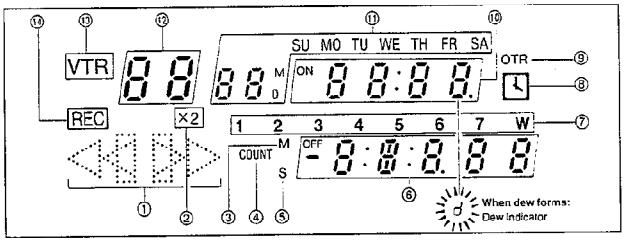
16. **Reset Button**

17. **Memory/Search Lock Button**

    When this button is pressed once, the Memory Indicator "M" will light up, and when it is pressed one more time, the Search Indicator "S" will appear instead.
    When it is pressed a third time the Search Indicator "S" will disappear.

18. **OTR Off Buttons**

19. **Multi Function Display**



① Tape Running Display
② Double Speed Indicator
③ Memory Indicator
④ Tape Counter Indicator
⑤ Search Look Indicator
⑥ Tape Counter Display
⑦ Timer Programme Number
⑧ Timer Recording Indicator
⑨ OTR Indicator
⑩ Clock Display
⑪ Date Display
⑫ Channel Display
⑬ VTR Indicator
⑭ Recording Indicator

20. **OTR On Button**

21. **Channel Selection Up and Down Buttons**

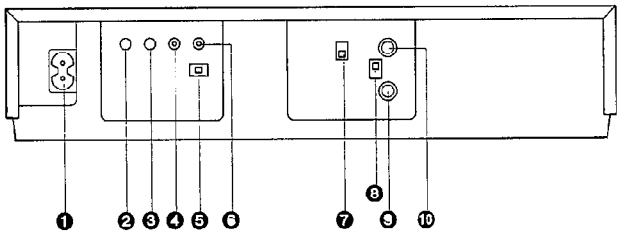
22. **VTR/TV Selector**

23. **Cassette Compartment**

24. **VTR On/Off Switch**

25. **Cassette-in Indicator**

REAR



1. **AC Mains Lead Socket**

   Connect the AC Mains Lead to the AC Mains Socket of VTR and outlet.

2. **Audio Input Socket**

3. **Video Input Socket**

4. **Audio Output Socket**

5. **Colour Mode/Test Signal Switch**

When Colour Mode/Test signal switch is selected to "TEST" , two vertical lines (Test signal) are generated from RF out.
Tune the TV set to VHF. Channel 3 or 4 (EN), 0 or 1 (A), 2 or 3 (EA) so that Test signal can be seen, when colour Mode/Test signal switch is selected to "AUTO" position, TV set is ready to receive the RF output signal from the VTR.

* If, during recording or playback, the colour is not satisfactory, it can be stabilized by setting colour Mode/Test signal switch to "COLOUR".

6. **Video Output Socket**

7. **Video Playback Channel Selector**

For selecting the built-in RF converter to channel which is not used for broadcasting in your area. (CH3 or 4 : EN, CH0 or 1 : A, CH2 or 3 : EA)

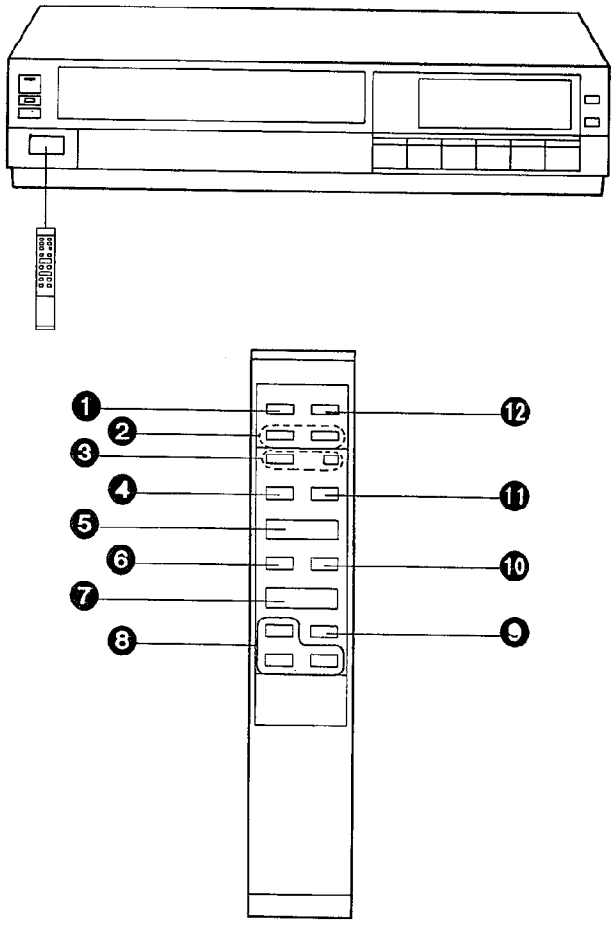
8. **RF Signal Level Switch**

Used to attenuate the reception of the VHF and/or UHF antenna signals.
If the reception is normal, set to "HIGH".
If the signal is strong, set to "LOW".

9. **RF Input Socket**

10. **RF Output Socket**

INFRA-RED REMOTE CONTROLLER



1. **VTR On/Off Switch**

For turning the VTR on and off.

2. **Programme Position (Channel) Selector Buttons**

3. **Record Buttons (●)**

To start recording, press the both buttons simultaneously.

4. **Pause/Still Button (❚❚)**

5. **Stop Button (■)**

6. **Rewind ◀◀/Review ⏮ Button**

When this button is kept pressed during playback, the VTR changes over to the Review playback mode.

7. **Play Button (▶)**

8. **Slow Button (▷)**

Press the Slow Button for slow-motion playback at 1/10 of normal speed. The slow playback speed can be varied between 1/30 and 1/5 of normal speed by using the "+" and "−" Buttons.

Note:
If the VTR is left in the slow playback mode for more than 10 minutes, the VTR will automatically switch over to the stop mode, to protect the tape and the video heads.

* Adjust the Slow Tracking Control if necessary.

9. **Double Speed Playback Button (X2)**

10. **Fast Forward ▶▶/Cue ⏭ Button**

When this button is kept pressed during playback, the VTR changes over to the Cue playback mode.

11. **Still Advance Button (▷❚❚)**

12. **VTR/TV Selector**

Note:

* The infra-red beam should be transmitted directly at the Infra-red Remote Control Receiver on the front of the VTR.
* Direct sunlight may interfere with the beam.
* The lightsensing angle of the Infra-red Remote Control Receiver window in the VTR is about 60 degrees.
* The unit should be used within a range of about 7 meters from the front of the VTR.

SECTION 2
ADJUSTMENT PROCEDURES

2-1. DISASSEMBLY METHOD

2-1-1. DISASSEMBLY FLOWCHART

This flowchart indicates disassembly steps of the cabinet parts and the Circuit Boards in order to find the necessary items for servicing.
When reassembling, perform the steps in the reverse order.

Note:
When removing the Front Panel, be careful to avoid any damages for the locking portions of the panel.

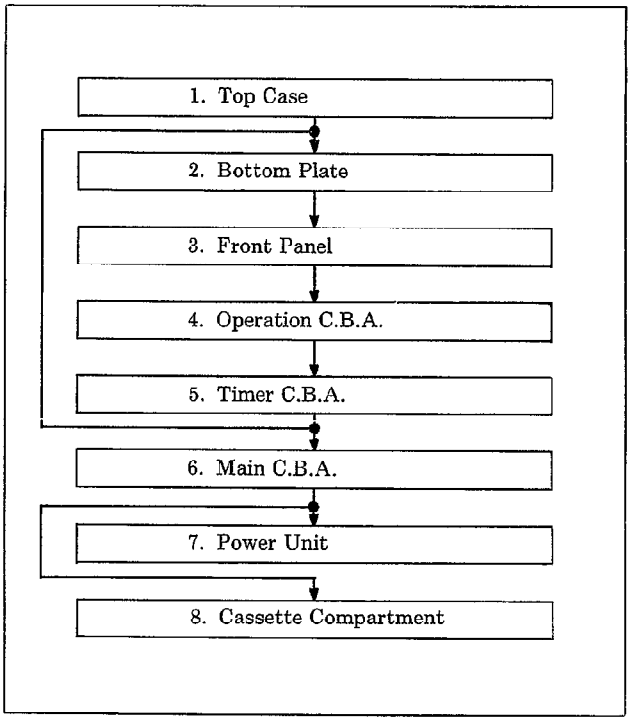


Fig. D1

2-1-2. DETAIL OF DISASSEMBLY METHOD

1 Removal of the Top Case
Remove the 2 screws (A), then carefully lift the rear of the Top Case to remove.

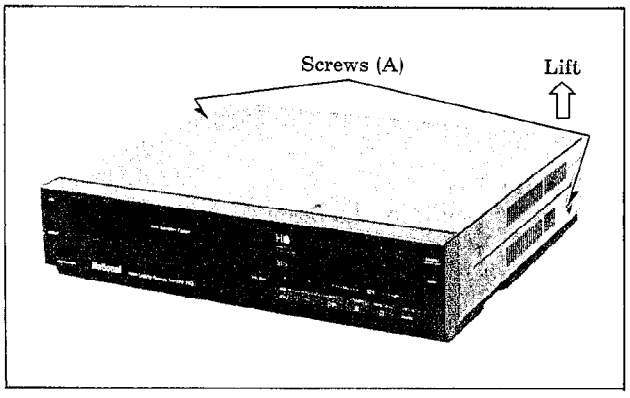


Fig. D2

2. Removal of the Bottom Plate
Place the deck up side down so that the bottom side faces upward.
Then remove the 4 screws (B).

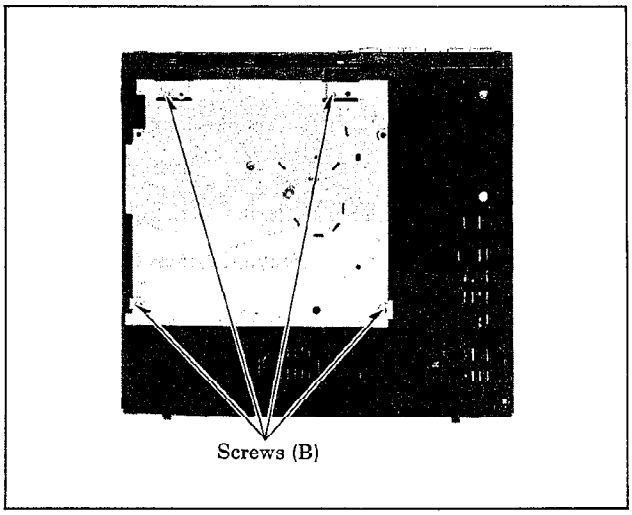


Fig. D3

Note:
Place the cushion under the deck to avoid any damages.

3. Removal of the Front Panel
Remove the 4 screws (C) and unlock the 6 locking portions (D).
Then hold the top portion of the panel and turn it toward the front side of the deck to remove.

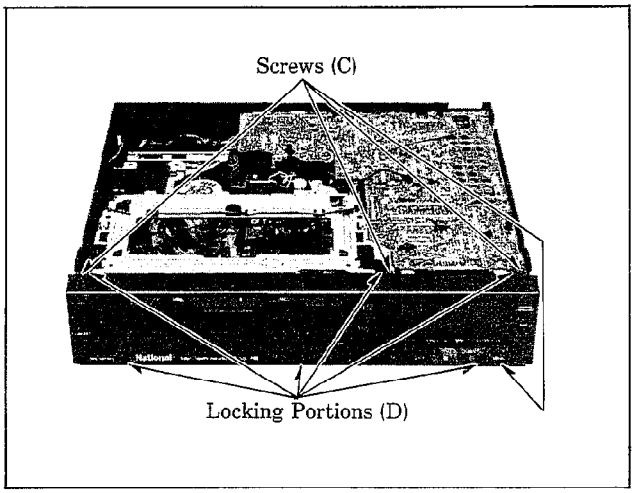


Fig. D4

4. Removal of the operation C.B.A.
Remove the 1 screw (E) and unlock 1 locking portion (F).

5. Removal of the Timer C.B.A
Remove the 2 screws (G) and unlock 2 locking portions (H).

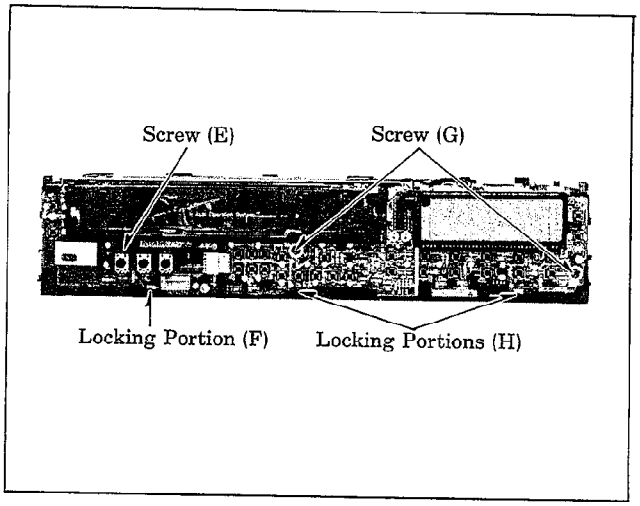


Fig. D5

6. Removal of the Main C.B.A.
Remove the 8 screws (I) and take out the Main C.B.A. Putting it up right position on the flame can be available as shown in Fig.D7.

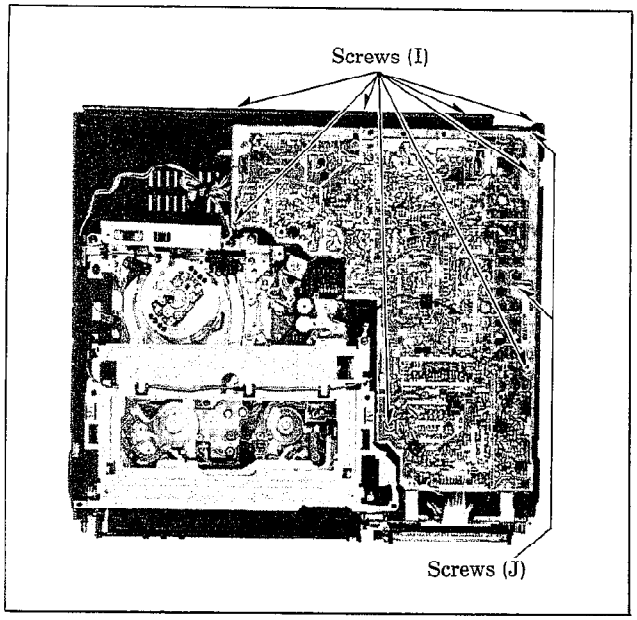


Fig. D6

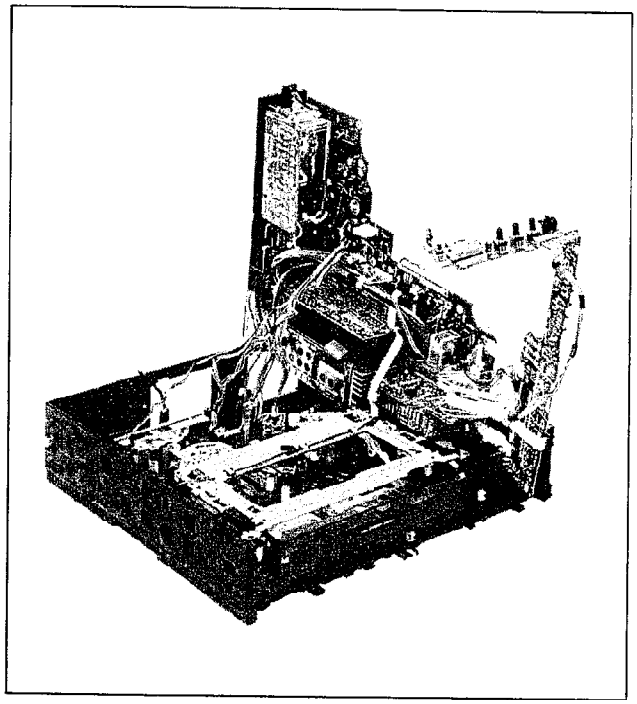


Fig. D7

7. Removal of Power Unit
Remove the 2 screws (J) and take it out from the Main C.B.A.as shown in Fig.D6.
Remove the shield case then checking can be performed.

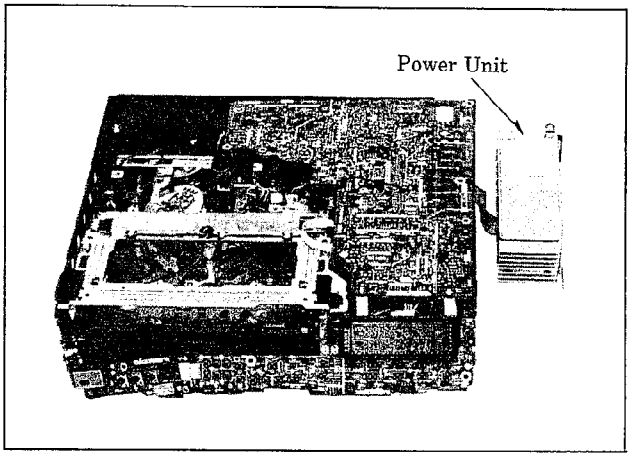


Fig. D8

8. Removal of Cassette Compartment
Remove the 2 screws (K).
Slide the cassette holder until appearing 2 screws (L) by turning (clockwise) the Capstan Rotor Unit (located in the bottom side as shown in Fig.D10) and remove the 2 screws (L).
Remove the flexible cable from connector P1503 mounted on Take-up Photo Tr C.B.A. ,then carefully pull out the Cassette Compartment.

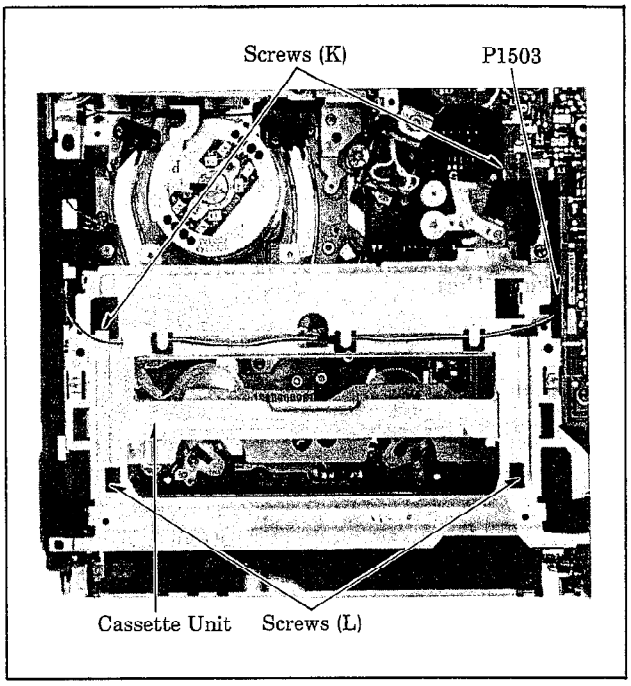


Fig . D9

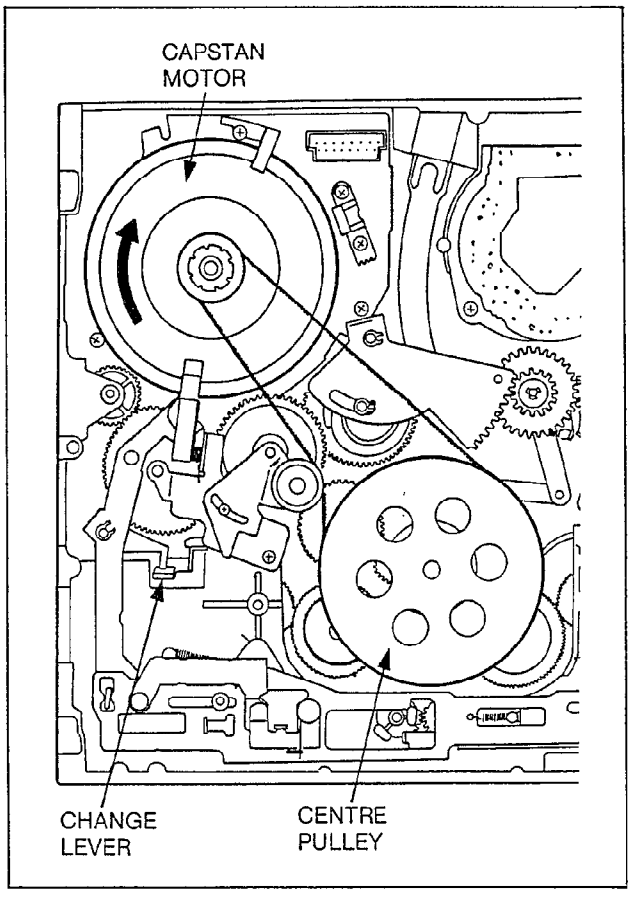


Fig . D10

Note1:
When reinstalling the Cassette Compartment, mechanichal adjustment (alignment) must be performed for correct working , refer to Mechanical Adjustment Procedures section item 2-4-10.(Reinstallation of Cassette Compartment) for mechanical adjustment (alignment).

2-2. REPLACEMENT OF THE CYLINDER UNIT

2-2-1. Replacement of the D.D Cylinder Unit

Work with extreme care when removing or replacing the D.D. cylinder unit.
Do not touch the video head during servicing.

1 Remove the 2 screws (M) to take the Head Amp Pack Out.
2 Remove the 1 screw (N) to take the Earth Holder Unit Out.
3. Disconnect the 5P connector on the cylinder drive C B.A.

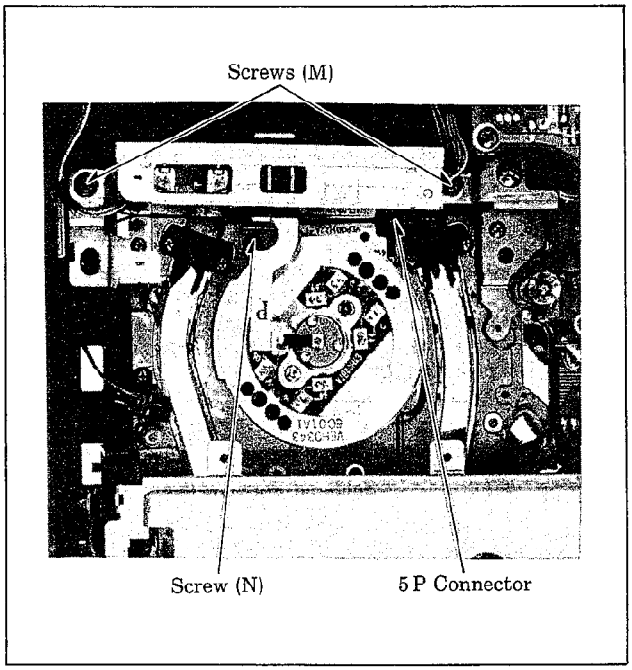


Fig . D11

4. Remove the 3 screws (O) to take the D.D. cylinder unit (with the cylinder drive C.B.A.) out.

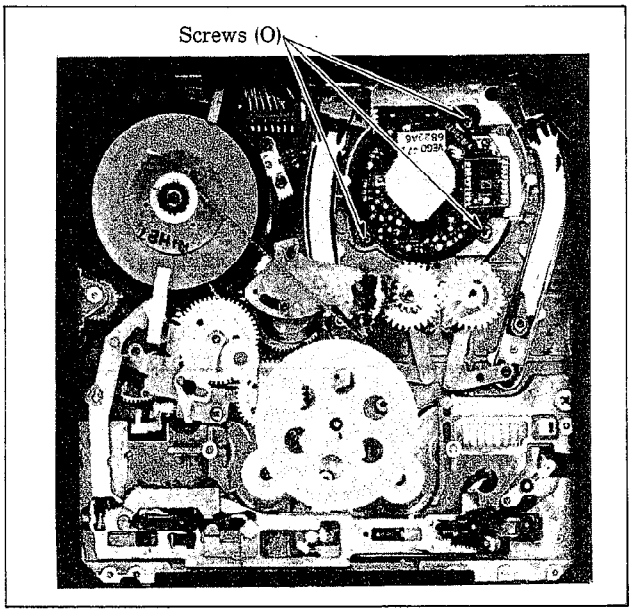


Fig . D12

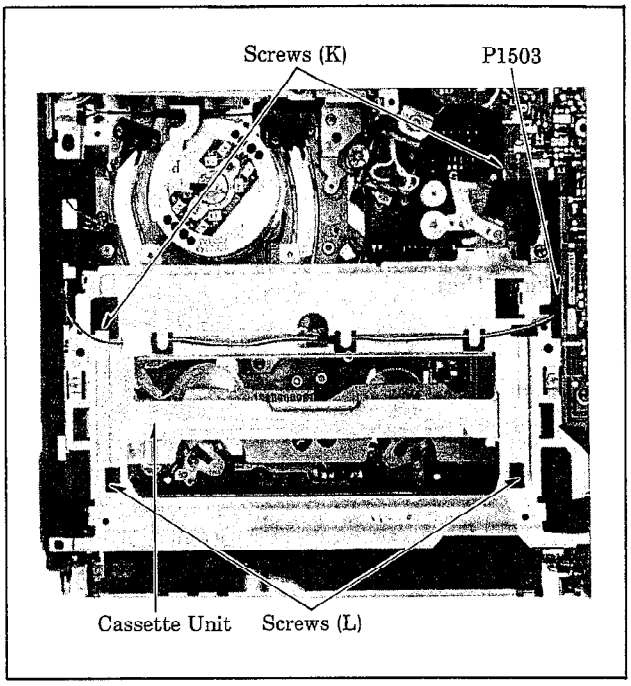


Fig . D9

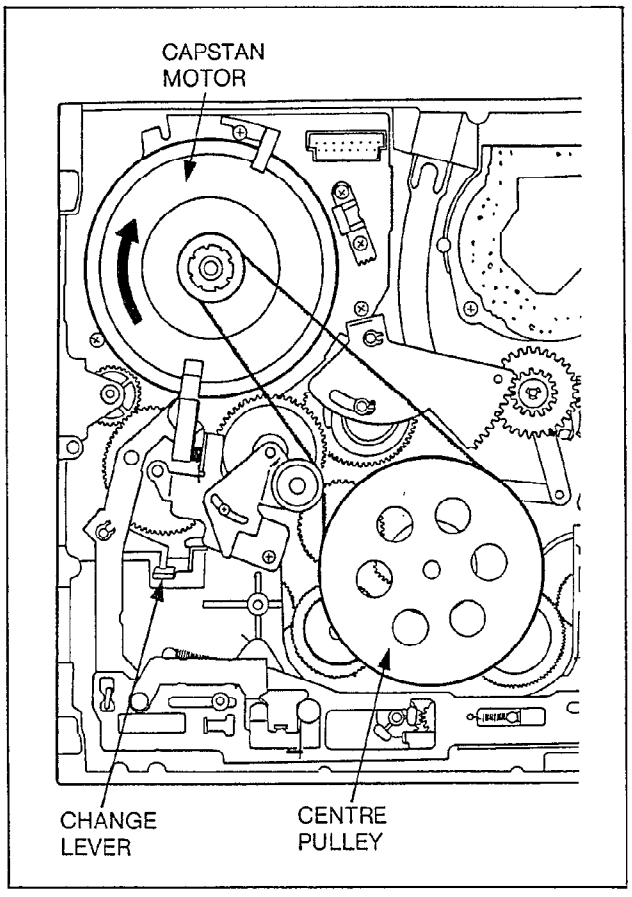


Fig . D10

Note1:
When reinstalling the Cassette Compartment, mechanichal adjustment (alignment) must be performed for correct working , refer to Mechanical Adjustment Procedures section item 2-4-10.(Reinstallation of Cassette Compartment) for mechanical adjustment (alignment).

2-2. REPLACEMENT OF THE CYLINDER UNIT

2-2-1. Replacement of the D.D Cylinder Unit

Work with extreme care when removing or replacing the D.D. cylinder unit.
Do not touch the video head during servicing.

1 Remove the 2 screws (M) to take the Head Amp Pack Out.
2 Remove the 1 screw (N) to take the Earth Holder Unit Out.
3. Disconnect the 5P connector on the cylinder drive C B.A.

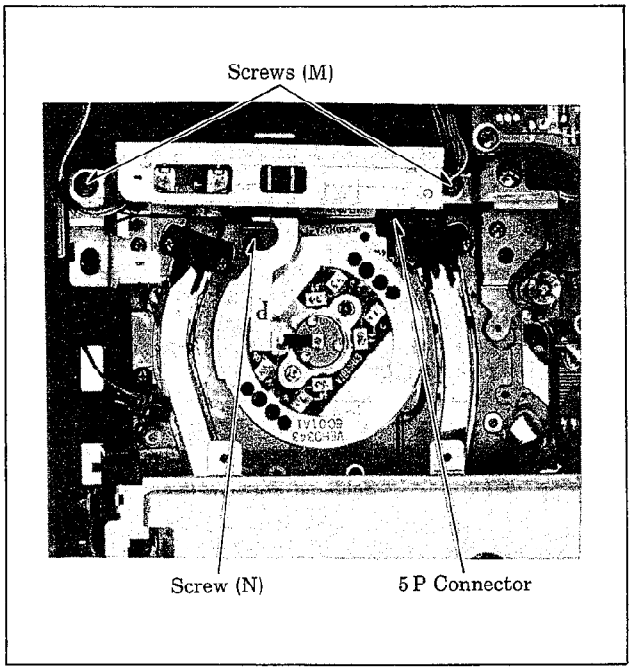


Fig . D11

4. Remove the 3 screws (O) to take the D.D. cylinder unit (with the cylinder drive C.B.A.) out.

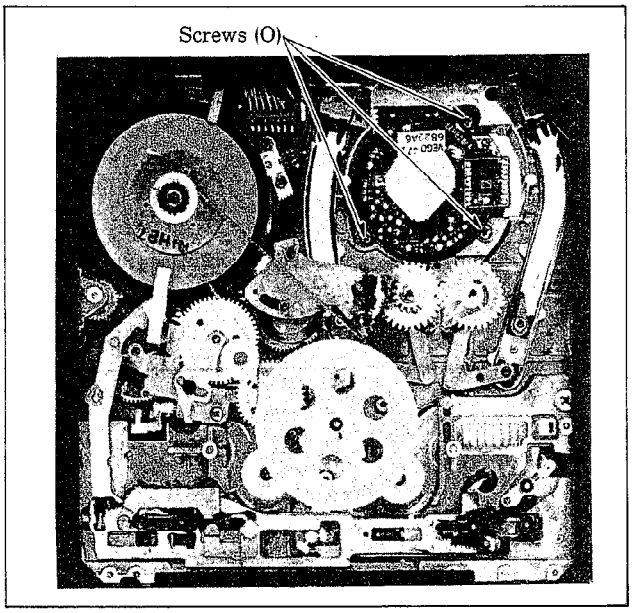


Fig . D12

Note:
Since there is very little clearance between the D.D. cylinder unit and the chassis, remove the D.D. cylinder unit gently and carefully.

5. Reinstall the new D.D.Cylinder Unit, tighten the 3 screws (O) and reinstall the Earth Holder Unit, tighten the 1 screw (N).
Then re-connect the Head Amp pack and 5P connector and tighten 2 screws (M).

Note:
(1) Gently rub the video head in direction of tape travel with Head cleaning stick.
(2) After replacement, confirm the performance. If any further maintenance is required, perform "TAPE INTER-CHANGE ABILITY ADJUSTMENT".

2-2-2. Replacement of the Cylinder Drive C.B.A.

1 Remove the D.D cylinder unit referring the Item 2-2-1.
2. Place the D.D. cylinder unit upside down.
3 Unsolder the soldered portion (P) for shield case to take it out.
4 Unsolder the 14 soldered portions (Q) indicated by an arrow mark (including 6 soldered portions inside of shield case).
5. Remove the 2 screws (R) to remove the cylinder drive C.B.A. unit.

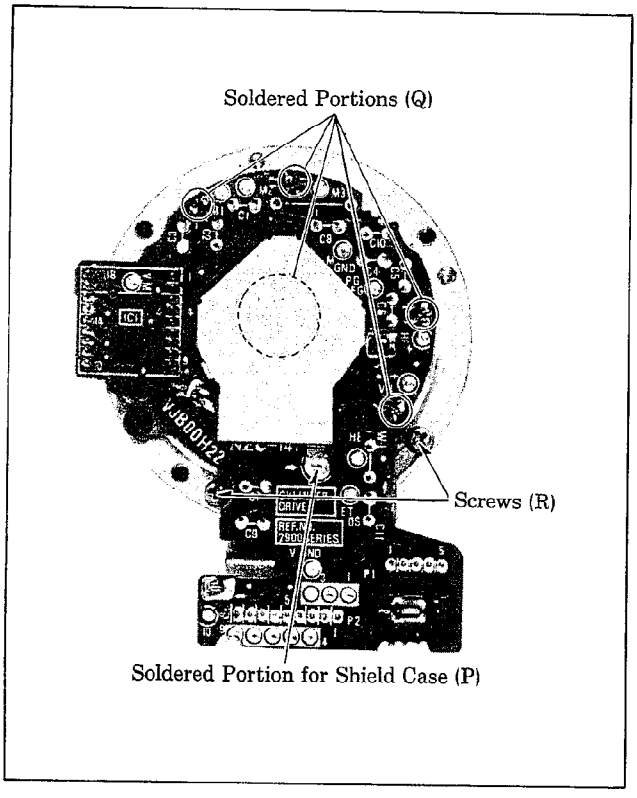


Fig . D13

6. Reinstalling is just reverse way of above procedures.

2-2-3. Replacement of the Cylinder Drive IC

1. Remove the Cylinder Drive C.B.A. as item 2-2-2.
2. Remove the screw (S) to take the heat sink plate out.
3. Unsolder the 18 soldered portions of the Cylinder Drive IC to take it out.
4. Reinstall the New IC with the care of Pins location.
5. Re-solder the 18 pins of the Cylinder Drive IC.
6. Reinstall the Cylinder Drive C.B.A. to the D.D. Cylinder Unit.

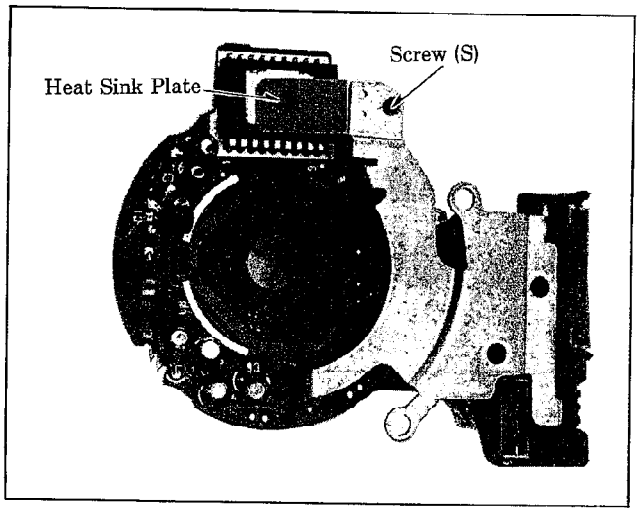


Fig . D14

2-2-4. Replacement of the Upper Cylinder Unit

1. Remove two screws as shown below.
2. Unsolder 8 soldered portions indicated by arrows on the C. Board.
3. Remove the Upper Cylinder Unit by lifting it upward.

Note:
Soldered portion can be easily removed by using solder sucking wire, etc.

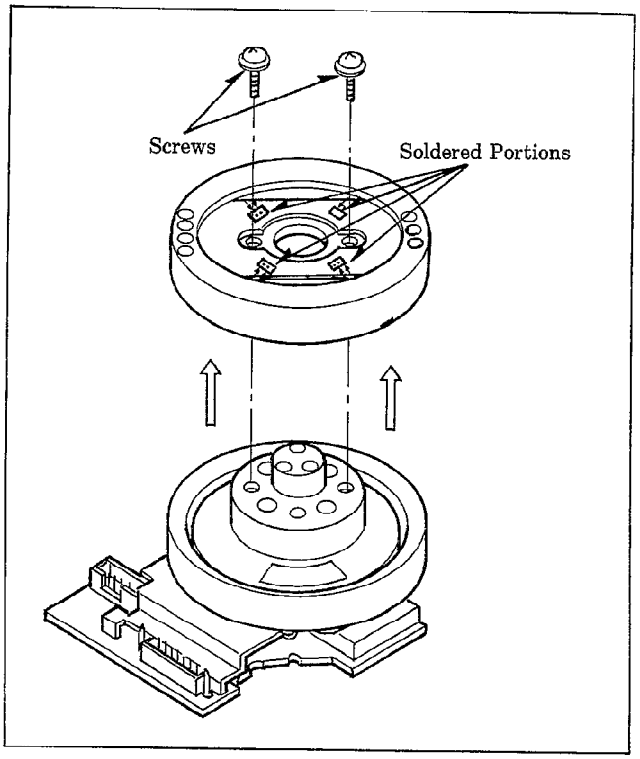


Fig . D15

4. The upper cylinder unit can be reinstalled by reversing the removal procedure, however, when the upper cylinder is reinstalling, be extremely carefull so that white portion of C. Board of the upper cylinder correctly matches the white portion of the bottom cylinder as shown below.

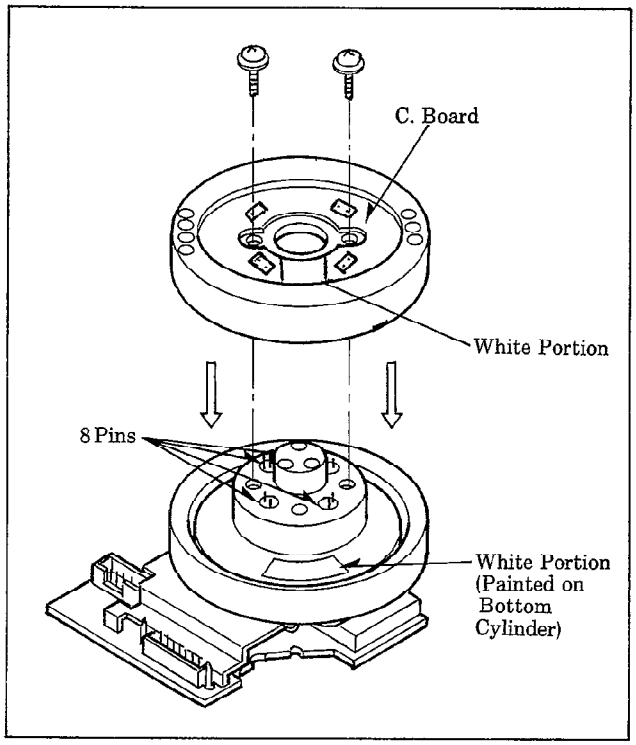


Fig . D16

Note:
1).If the Upper Cylinder Unit is reversely installed, no colour would appear when playing back a pre-recorded tape.
2).Do not loosen the 3 small screws on the top of the cylinder as shown below .
If these 3 screws are loosend, Cylinder motor is broken and not restored.

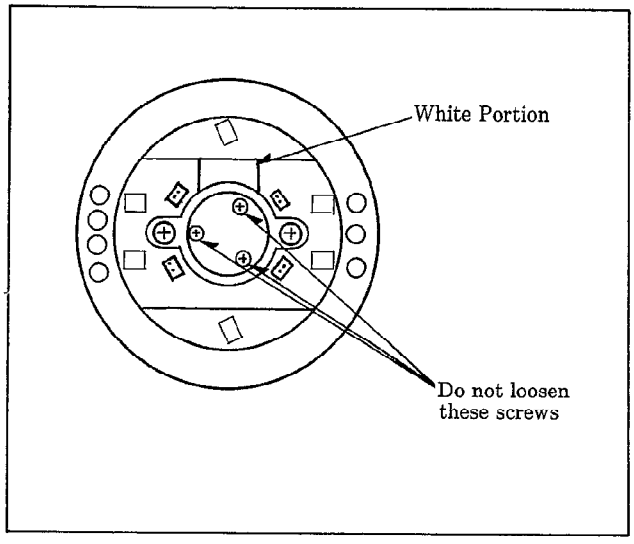


Fig. D17

2-3. MECHANICAL ADJUSTMENT PROCEDURES

2-3-1. TENSION ADJUSTMENT OF TIMING BELT

(Equipment Required)
Fan Type Tension Gauge (VFK62)

(Specification) 40 +– 5g

1. Loosen a screw (A) slightly by using the screwdriver.
2. Set the Fan Type Tension Gauge to the direction indicated by the arrow (B) as shown in Fig. M1.
3. Tighten a screw (A) when the reading of the Fan Type Tension Gauge becomes within 40 +– 5g.

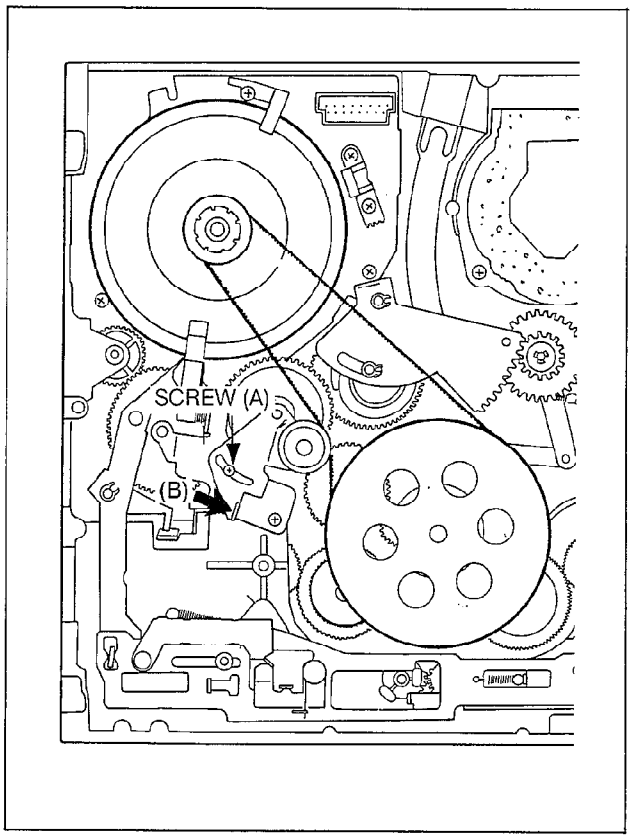


Fig. M1

2-3-2. POSITION ADJUSTMENT OF TENSION POST

(Equipment Required)
Tension Post Adjustment Plate (VFK0387)
Hex. Wrench : 2mm (Hex Wrench Set : VFK0326)

1. Disconnect the AC plug.
2. Remove the cassette compartment and disconnect the flexible (flat) cable from P1503.
3. Turn the Capstan Motor to the clockwise while the change lever is being pushed until the loading is completed as shown in Fig. M2.

4. The upper cylinder unit can be reinstalled by reversing the removal procedure, however, when the upper cylinder is reinstalling, be extremely carefull so that white portion of C. Board of the upper cylinder correctly matches the white portion of the bottom cylinder as shown below.

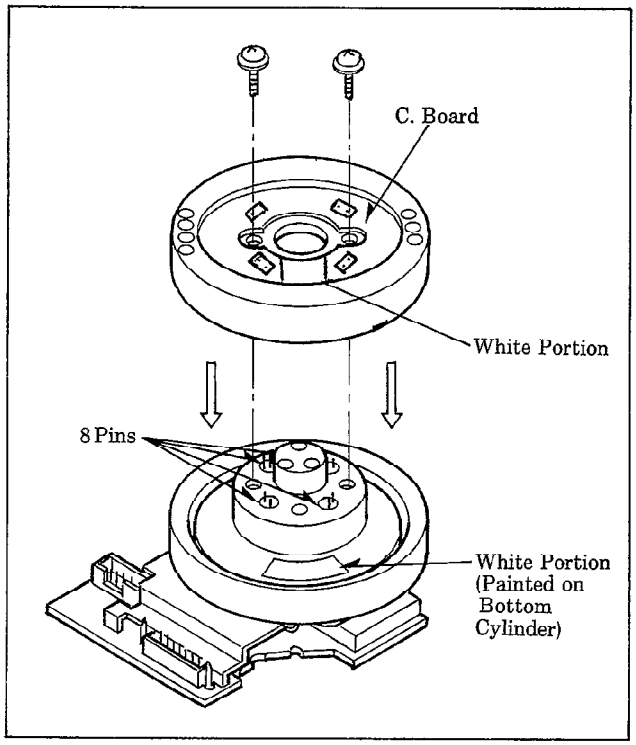


Fig . D16

Note:
1).If the Upper Cylinder Unit is reversely installed, no colour would appear when playing back a pre-recorded tape.
2).Do not loosen the 3 small screws on the top of the cylinder as shown below .
If these 3 screws are loosend, Cylinder motor is broken and not restored.

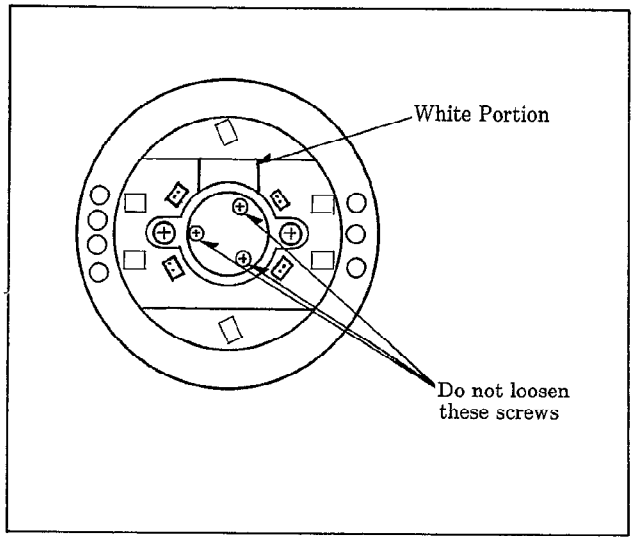


Fig. D17

2-3. MECHANICAL ADJUSTMENT PROCEDURES

2-3-1. TENSION ADJUSTMENT OF TIMING BELT

(Equipment Required)
Fan Type Tension Gauge (VFK62)

(Specification) 40 +– 5g

1. Loosen a screw (A) slightly by using the screwdriver.
2. Set the Fan Type Tension Gauge to the direction indicated by the arrow (B) as shown in Fig. M1.
3. Tighten a screw (A) when the reading of the Fan Type Tension Gauge becomes within 40 +– 5g.

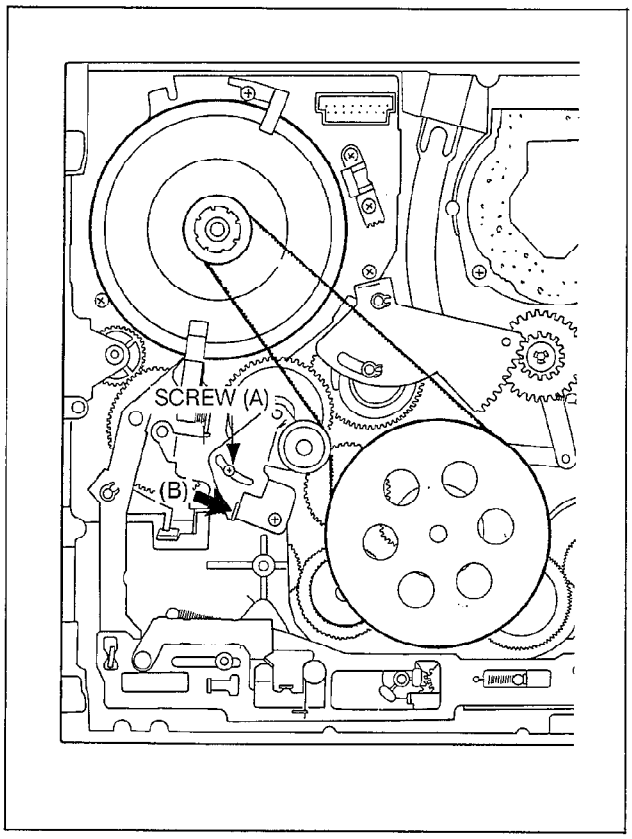


Fig. M1

2-3-2. POSITION ADJUSTMENT OF TENSION POST

(Equipment Required)
Tension Post Adjustment Plate (VFK0387)
Hex. Wrench : 2mm (Hex Wrench Set : VFK0326)

1. Disconnect the AC plug.
2. Remove the cassette compartment and disconnect the flexible (flat) cable from P1503.
3. Turn the Capstan Motor to the clockwise while the change lever is being pushed until the loading is completed as shown in Fig. M2.

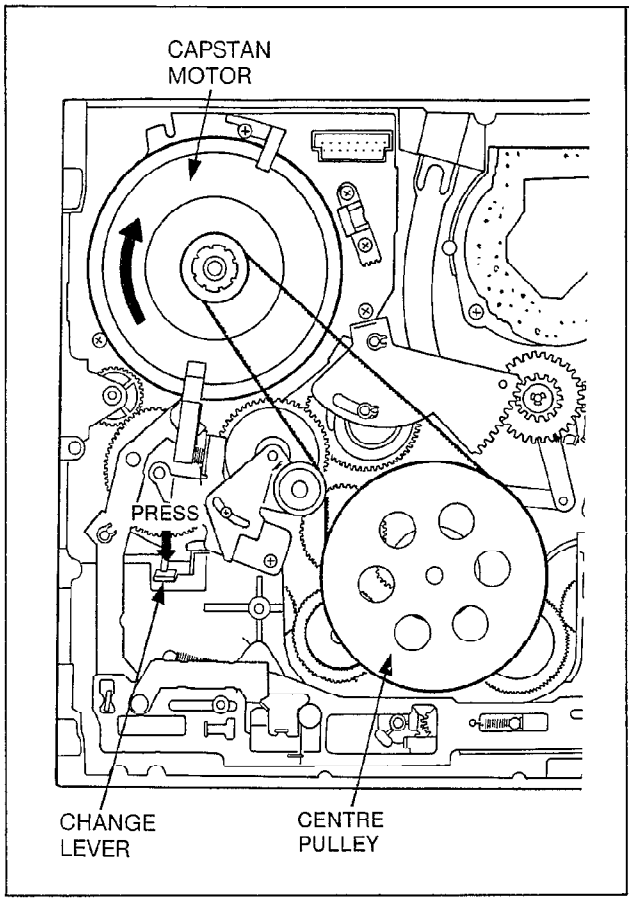


Fig. M2

4. Place the Adjustment Plate and insert the hex wrench into the hole of Tension Band Fastener as shown in Fig. M3.

5. Adjust the hole of Tension Band Fastener by using the hex wrench so that the Tension Post just touches the fixture of Adjustment Plate.
6. After the Adjustment, turn the Capstan Motor until the unloading is completed.

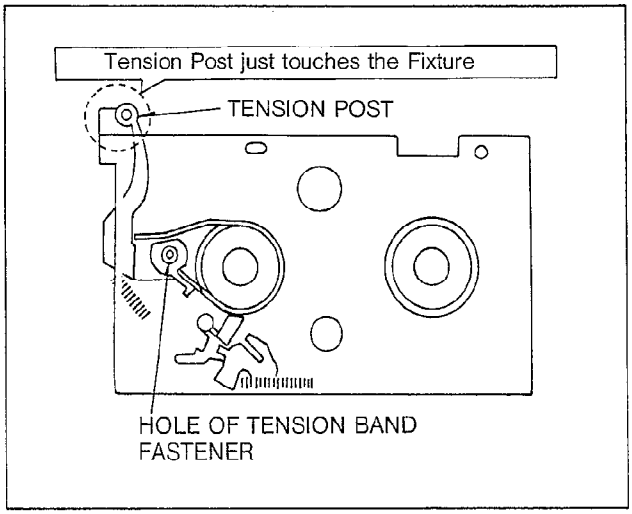


Fig. M3

Note:
When you assemble cassette compartment,refer to item 2-4-10 Reinstallation of Cassette Compartment.

2-3-3. MEASUREMENT AND ADJUSTMENT OF BACK TENSION

(Equipment Required)

Back Tension Meter (Tentelometer or VFK0132)
VHS Cassette Tape (120 minutes tape)

(Specification) 20~25g

1. Playback the cassette tape from the beginning and wait until the tape movement get the stabilization. (for appox. 10~20 seconds)
2. Insert the Back Tension Meter into the path of a tape, and measure the back tension to be within specification as shown in Fig. M4.

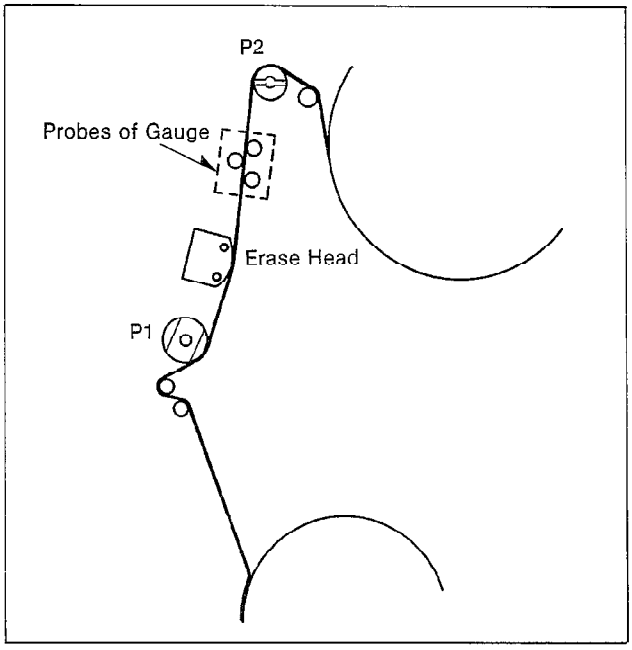


Fig. M4 Measurement of Back Tension

Note:
1. While measuring, make sure that the three probes of the meter are all in good contact with the tape.
2. As the tension meter is very sensitive, we recommend taking 3 separate readings.
3. If it is out of specification, change the spring notch as shown in Fig. M5.

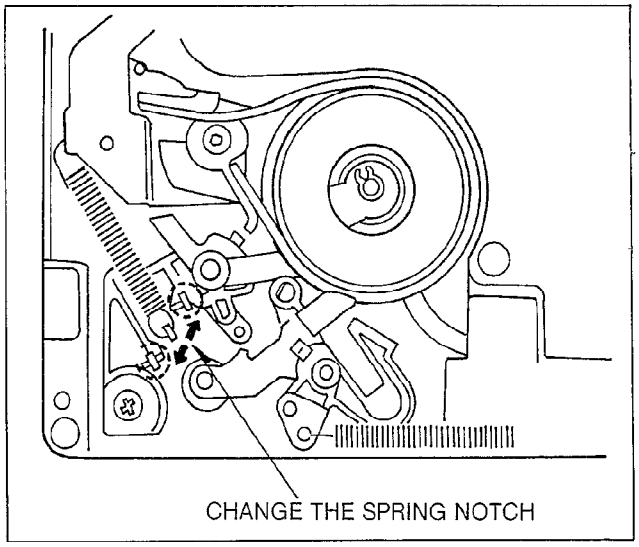


Fig. M5

2-3-4. HEIGHT ADJUSTMENT OF THE REEL TABLES

(Equipment Required)
Post Adjustment Plate (VFK0191/Tool Kit:VFK0283)
Reel Table Height Gauge(VFK0190)

(Specification) 0~0.2mm

1. Remove the cassette compartment.
2. Place the Post Adjustment Plate on the reel tables.
3. Place the Reel Table Height Gauge on the plate so that the scraper of the gauge touches the cut-out portion of the plate, then set the gauge to zero "0" as shown in Fig. M6.

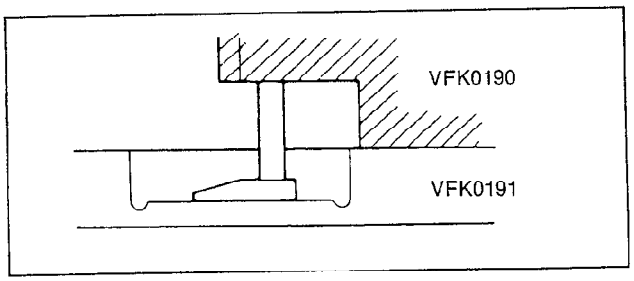


Fig. M6 Adjustment of Reel Table Height-(1)

4. Measure the meter indication of top surface or reel table as shown in Fig. M7. And then perform the same measurement and confirmation for the other reel table.

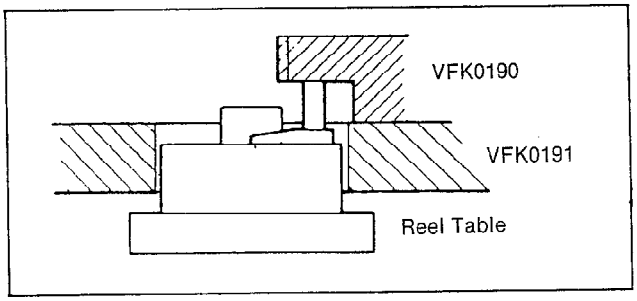


Fig. M7 Adjustment of Reel Table Height-(2)

5. If the difference is more than 0.2mm higher of lower, replace the poly-slider washer located under the reel table with one of the appropriate thickness. Poly-slider washers are avilable in thickness of 0.13mm, 0.25mm and 0.5mm.

Thickness / Washer	Part No.
0.13mm	XWXV3Z6
0.25mm	XWXV3A6
0.5mm	VMX1171

Fig. M8

Note:
If you use 0.13mm or 0.25mm washers,put these (0.13mm or 0.25mm)washers under the 0.5mm washer (Put these washers on the chassis)

2-3-5. ADJUSTMENT OF THE CAPSTAN THRUST GAP

(Equipment Required)
Reel Table Height Gauge (VFK0190)
Height Adjustment Jig (VFK0344/Tool Kit:VFK0283)

(Specification) 0.5 ~ 0.55mm

1. Turn a Thrust Adjust Screw slightly until the capstan roter unit just touches the coil of the capstan stator unit.

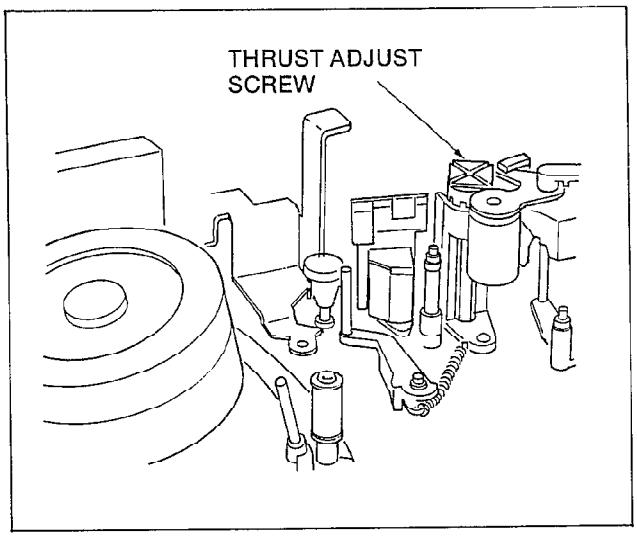


Fig. M9

2. Set the height adjustment Jig on the capstan Roter unit.
3. Place the height gauge on the bottom case unit and set the height gauge to zero "0".

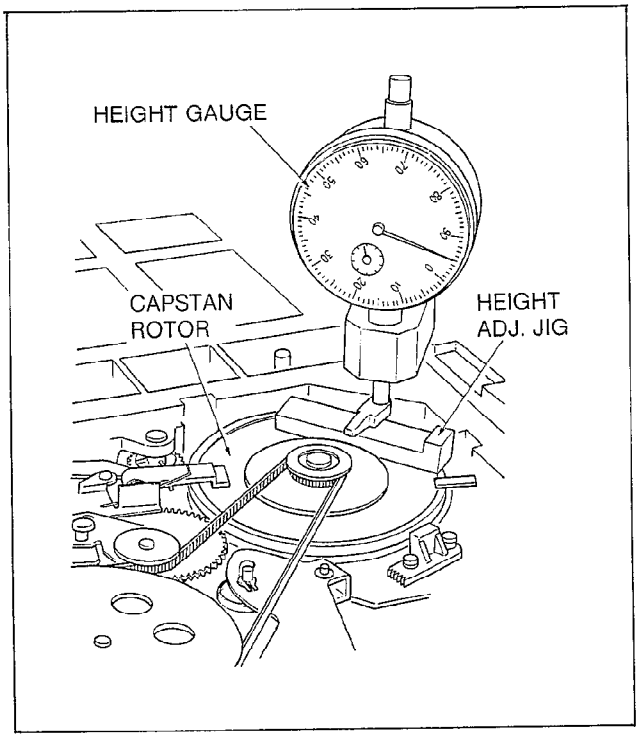


Fig. M10

4. Adjust a Thrust Adjust Screw so that the thrust gap becomes 0.5 ~ 0.55mm.

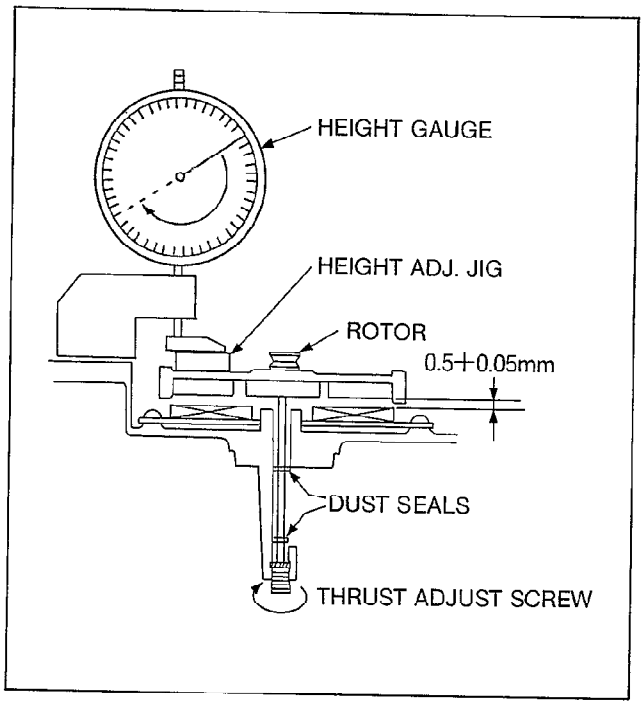


Fig. M11

2-3-6. HEIGHT ADJUSTMENT OF TAPE GUIDE POST (P2 AND P3)

(Equipment Required)
Post Adjustment Plate (VFK0191/Tool Kit: VFK0283)
Reel Table Height Gauge (VFK0190)
Post Adjustment Screwdriver (VFK0329/Tool Kit: VFK0283)

1. Remove the cassette compartment.
2. Place the Post Adjustment Plate over the reel tables.
   Confirm that the Post Adjustment Plate is firmly seated as shown in Fig. M12.

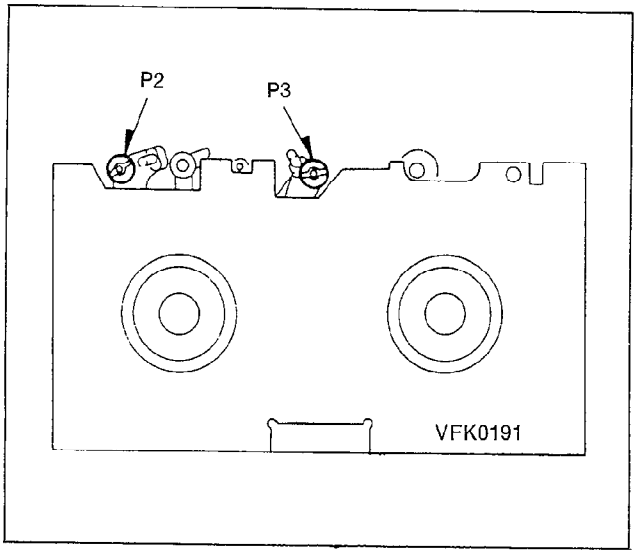


Fig. M12

3. Lower 2 tape guide posts (P2 and P3) by turning the Post Adjustment screwdriver so that the condition of height becomes as shown in Fig. M13. That is, the lower edge of Tape guide should be lower than surface of Adjustment Plate.

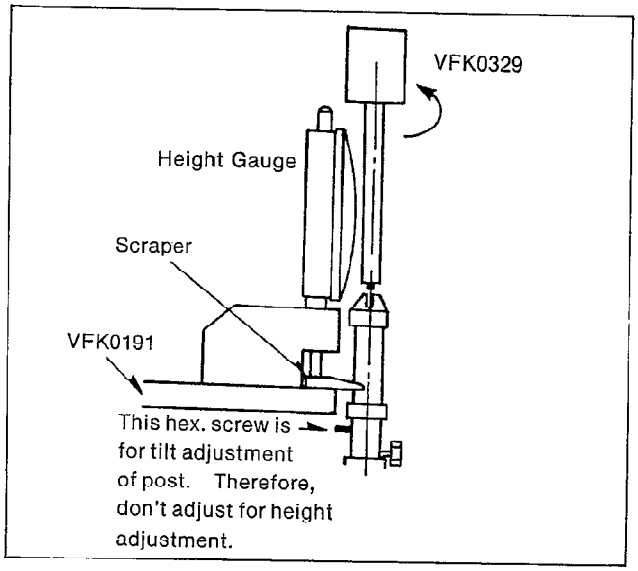

VFK0329
Height Gauge
Scraper
VFK0191
This hex. screw is for tilt adjustment of post. Therefore, don't adjust for height adjustment.

Fig. M13

4. Place the scraper of Reel Table Height Gauge as shown in Fig. M14.
   Set the gauge to zero, then raise the post slowly until the lower tape guide just touches the bottom of the scraper. Use the gauge to determine the exact point at which the lower tape guide touches the scraper.

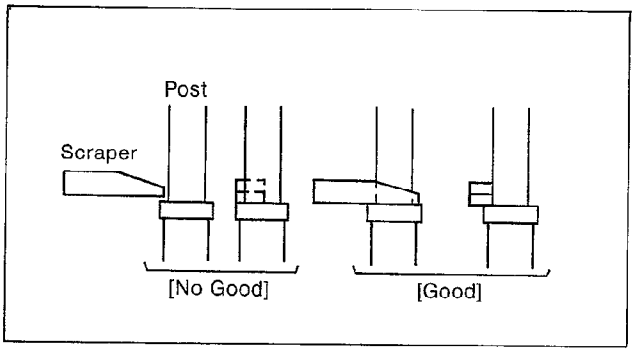


Fig. M14

Note:
After the adjustment, install the cassette compartment refering the item 2-4-10 Reinstllation of cassette compartment.

2-3-7. HEIGHT ADJUSTMENT OF THE PULL-OUT POST (P5 POST)

(Equipment Required)
Post Adjustment Plate (VFK0191/Tool Kit: VFK0283)
Reel Table Height Gauge (VFK0190)
Nut Driver (Purchase locally)

(Specification) −0.06 +− 0.01mm

Note:
Unless the replacement or adjustment of this post is required, the adjustment nut should not be turned.

1. Remove the cassette compartment.
2. Place the Post Adjustment Plate over the reel tables.
3. Turn the Capstan Motor to counterclockwise (loading direction) until the mechanical condition becomes as shown in Fig. M15.

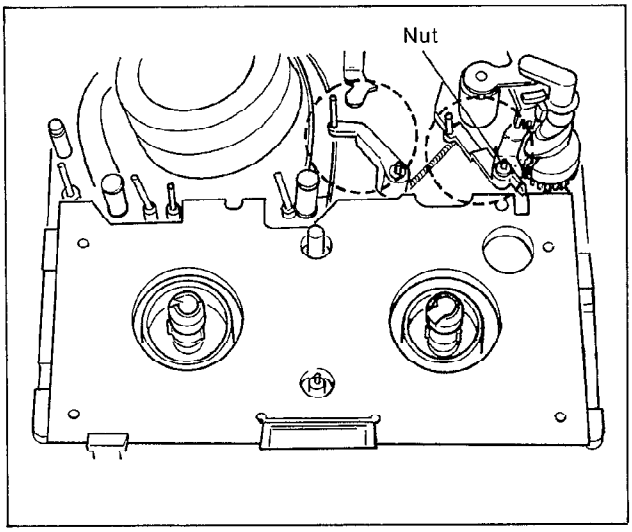


Fig. M15

4. Place the Reel Table Height Gauge on the Post Adjustment Plate and set the gauge to zero "0" as shown in Fig. M16.

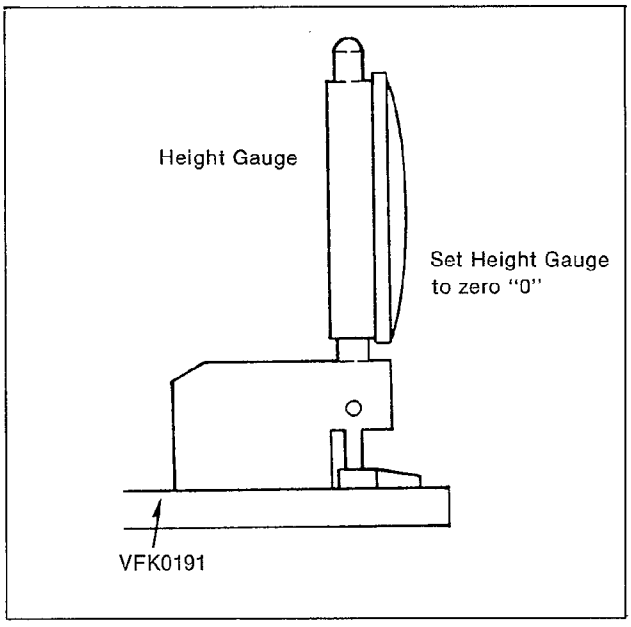


Fig. M16

5. Place the Reel Table Height Gauge as shown in Fig. M17 and turn the nut slowly until the gauge reads −0.06 +− 0.01mm.

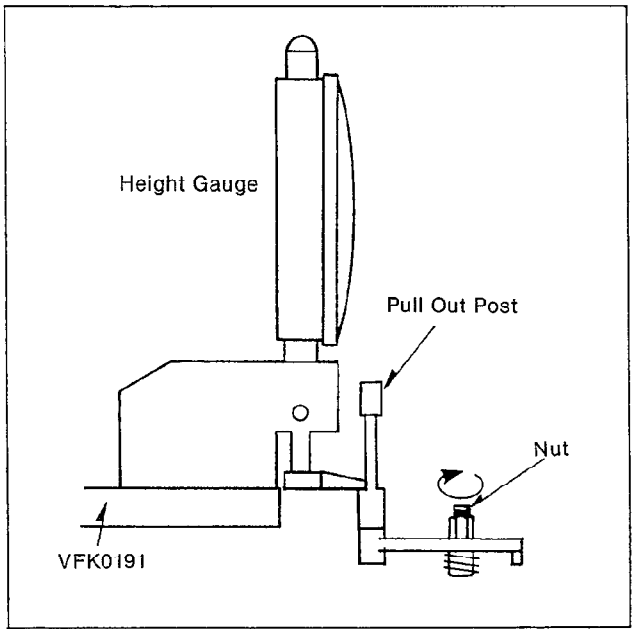


Fig. M17

6. After the adjustment, install the cassette compartment. (Refer to 2-4-10 Reinstallation of Cassette Compartment).

7. Play back a normal cassette tape and make sure that the edges of the tape are not curling at the bottom or top end of the posts P1, P2, P3, P4 and pull out post as shown in Fig. M18.

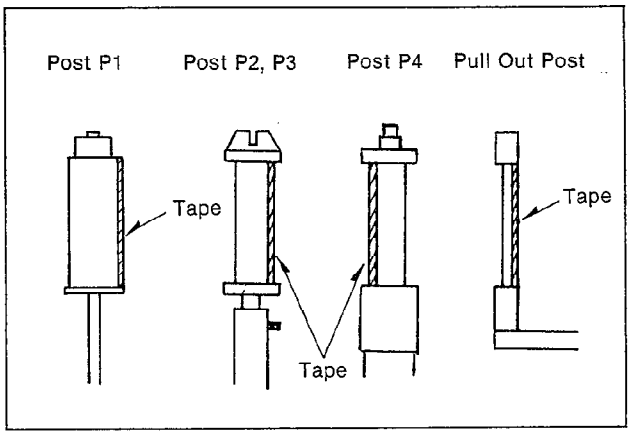


Fig. M18

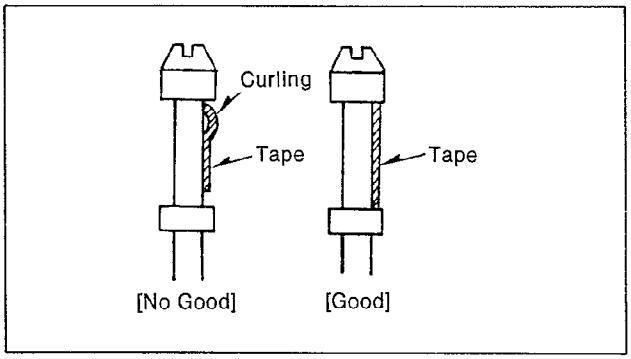


Fig. M19

8. If curling appears, readjusts each post(except P1,P4).

2-3-8. TAPE INTERCHANGEABILITY ADJUSTMENT

Note:
Proceed the following procedures for Tape Interchangeability Adjustment to do it Correctly and Smothly.

A. Confirmation and Adjustment of P2 and P3 Posts.
B. Tilt Adjustment of A/C Head.
C. Height Adjustment of A/C Head.
D. Azimuth Adjustment of A/C Head.
E. Horizontal Position of A/C Head.

If the Tape Interchangeability Adjustment is not perfect, repeat the above procedures from A to E.

A. Confirmation and Adjustment of P2 and P3 Posts

(Equipment Required)
Alignment Tape (VFJ8125H3F)
Post Adjustment Screwdriver (VFK0329/Tool Kit : VFK0283)

1. Set the tracking control into the fix position. And connect the oscilloscope to the output of the Head Amp as shown in Fig. M20.

Note:
To get a stable waveform of the Head Amp output on the oscilloscope, use the head switching pulse as a triggering signal as shown in Fig.M20

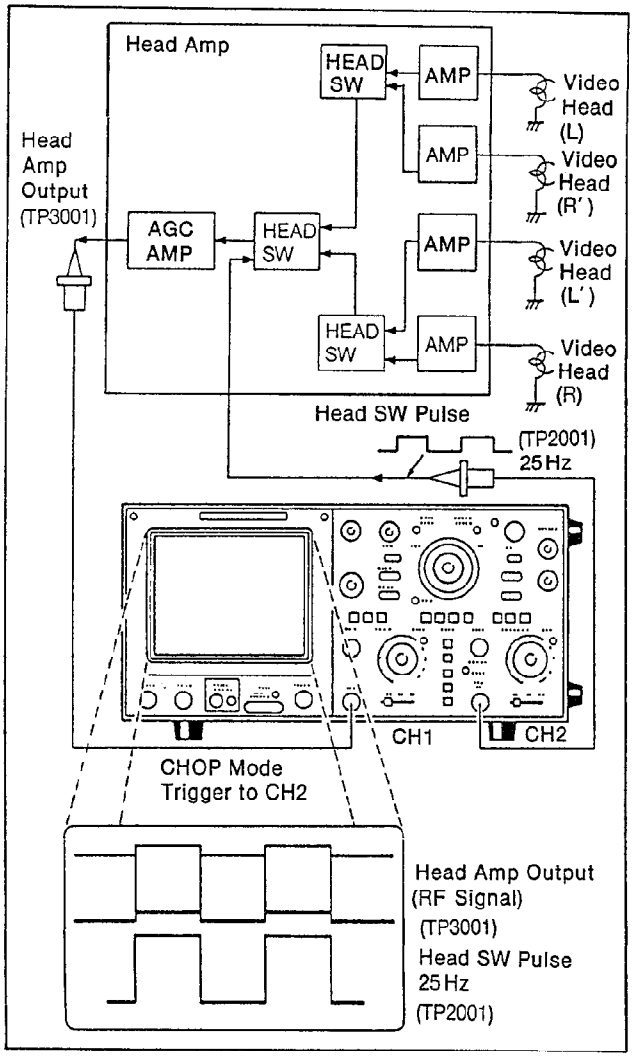


Fig. M20 Connection of Oscilloscope

2. Play back the alignment tape (VFJ8125H3F).
3. If the RF envelope appears like example "A" or "B" in Fig. M21 then adjustment of the tape guide post (P2 : Entrance) is necessary.
4. Adjust the tape guide post (P2) with the post adjustment screwdriver so that the RF envelope waveform at the entrance portion becomes flat as shown in Fig. M21-"C".

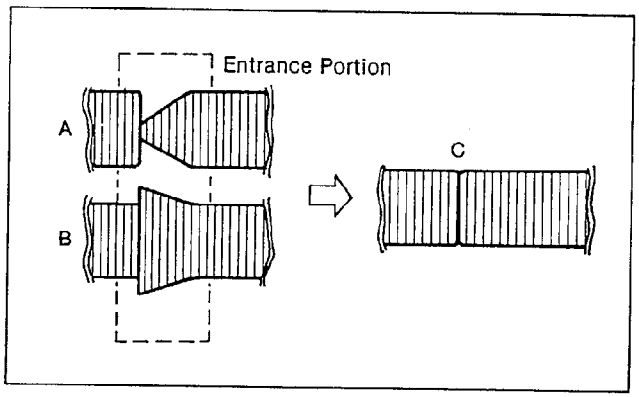


Fig. M21

5. If the RF envelope appears like example "D" or "E" in Fig. M22, then adjustment of the tape guide post (P3:Exit) is necessary.
6. Adjust the tape guide post (P3) in the same manner as the P2 post so that the exit portion becomes flat as shown in Fig. M22-"F".

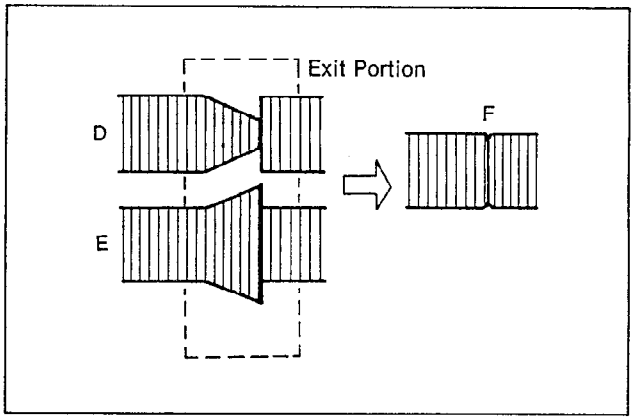


Fig. M22

7. Turn the Tracking VR fully clockwise and counter clockwise. The output envelop should vary nearly parallel with other condition as shown in Fig. M23.
8. Turn the Tracking VR into centre fix position and adjust for maximum RF envelope.
If the RF envelope does not meet these specifications,
V1/V>=0.7 , V2/V>=0.8 ,
then repeat steps 1-8 again.

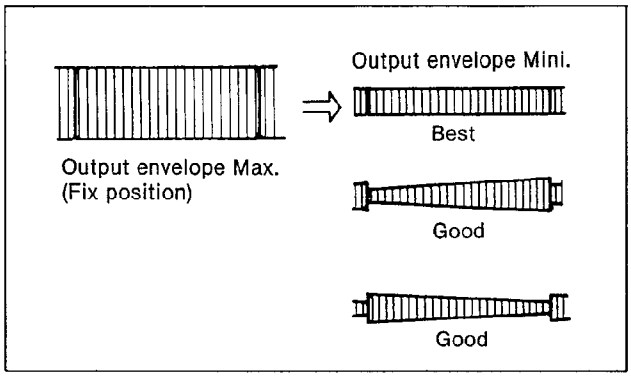


Fig. M23

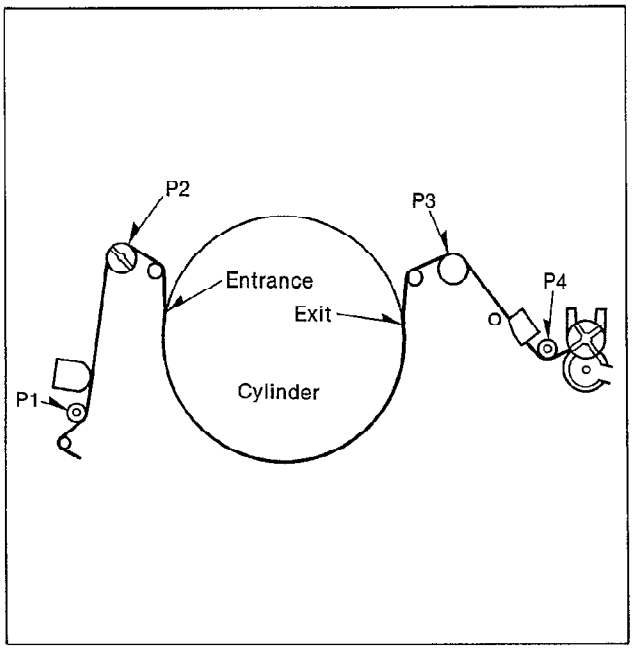


Fig. M24 Loading Position of Posts

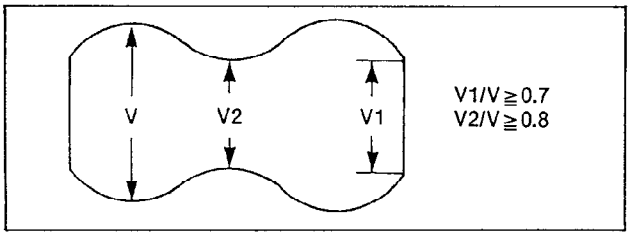


Fig. M25 Spec. of Envelope Figure

B. Tilt Adjustment of A/C Head

Note:
This procedure should be performed after replacing the A/C HEAD and pressure roller.

Playback the beginning portion of blank cassette tape and confirm that the tape runs between lower and upper limiter of P4 post. If there is waving or frilling in the lower edge or top edge of the tape, correct the tilt of the A/C head by turning the screw (B) located behind the A/C head.

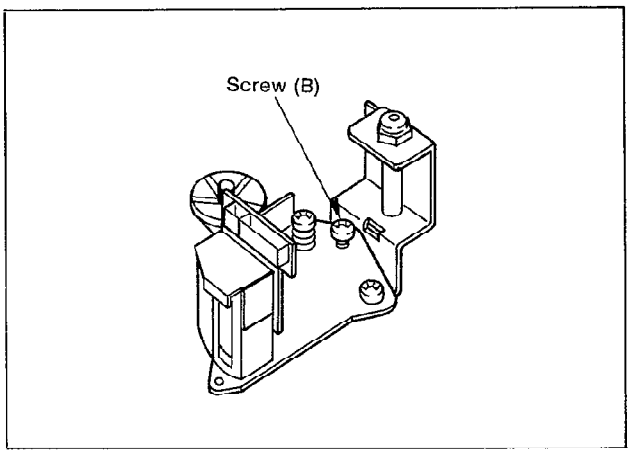


Fig. M26

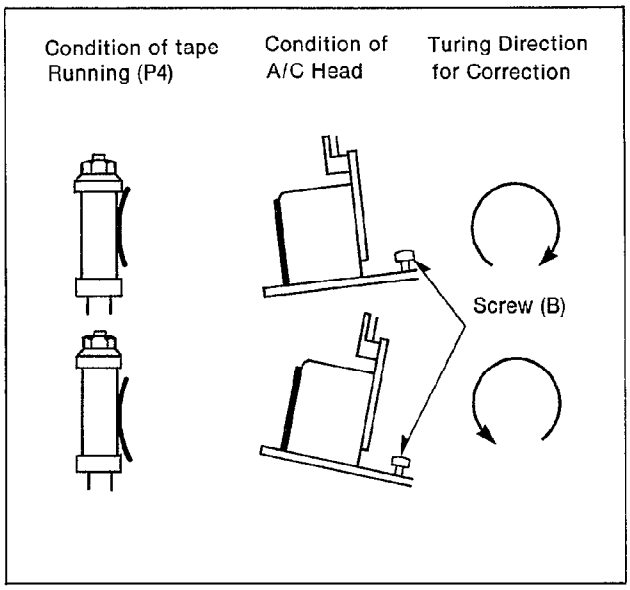


Fig. M27

Note:
After Tilt adjustment of A/C head, height adjustment of A/C head is required.

C. Height Adjustment of A/C Head

Note:
This procedure should be performed only when the A/C Head is replaced.

(Equipment Required)
Check Light (VFK0343)
Nut Driver (Purchase locally)

With the tape running, look at the lower edge of the control head by using the check light and check if the lower edge of tape runs along the lower edge of the control head.
If it doesn't,slightly turn the nut (C) behind the A/C Head (Fig. M28) to either lower or raise the A/C head so that the tape runs along the lower edge of the control head.
Turn the nut (C) clockwise to lower the head, and counter-clockwise to raise it.

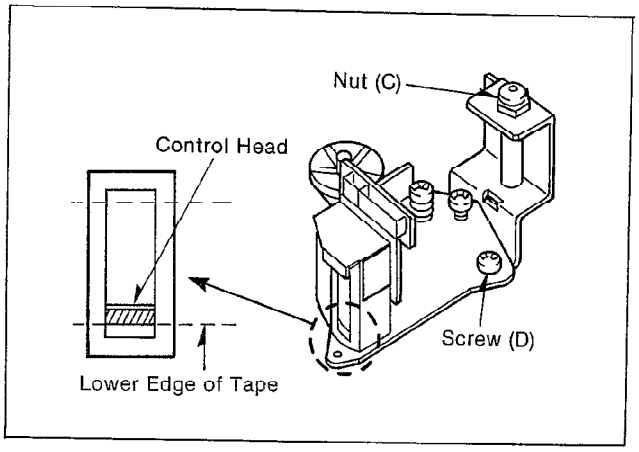


Fig. M28

D. Azimuth Adjustment of A/C Head

Note:
This procedure should be performed only when the A/C Head is replaced and posts hight are readjusted.

(Equipment Required)
Alignment Tape (VFJ8125H3F)

1. Connect the oscilloscope to the audio output on the rear panel.
2. Play back the 2nd portion (Normal Audio 6KHz) of the alignment tape (VFJ8125H3F).
3. Adjust the screw (D) so that the output level becomes maximum.

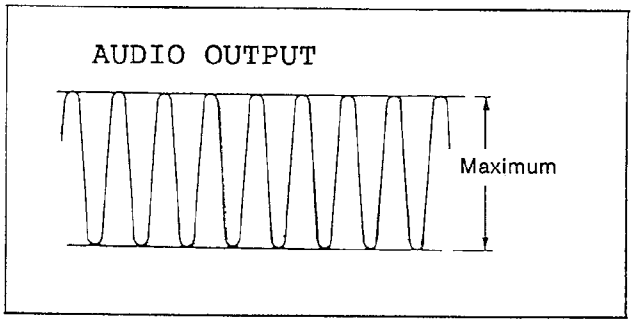


Fig. M29

E. Horizontal Position Adjustment of A/C Head

Note:
This procedure should be performed only when the A/C head is replaced, and after performing the tape interchangeability adjustment.

(Equipment Required)
H-Position Adjustment Screwdriver (VFK0328/Tool Kit: VFK0283)
Alignment Tape (VFJ8125H3F)

1. Set the Tracking Control VR to the centre fix position.
2. Connect the oscilloscope to the output of Head Amp. (Refer to Fig. M20)
3. Play back the alignment tape (VFJ8125H3F).
4. Adjust the Horizontal Position Screw of A/C head so that the RF signal becomes maximum level.

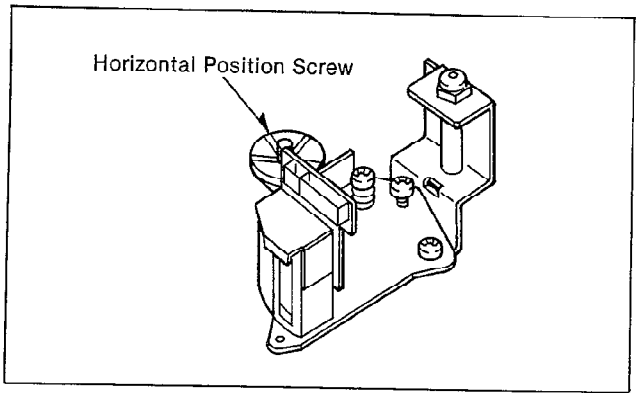


Fig. M30

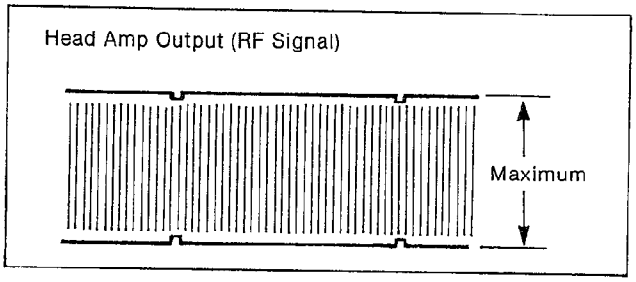


Fig. M31

2-4 ASSEMBLY AND ADJUSTMENT PROCEDURES OF MECHANISM

The mechanism of this model is mostly engaged to the System Control Circuit, through the mode select switch.
Therefore the relation between the mode select switch and the cam gear decides all further mechanical movement of the mechanical parts such as levers, gears, rollers and so on.
If these parts are not fixed properly, the unit will be unloaded or compulsorily stopped.
And it will result being damaged at any mechanical or electrical parts.
The overall mechanical condition (alignment) of bottom and top view are shown in Fig. A1 and Fig. A2. This mechanical adjustment is Performed in STOP mode.
The detail of mechanical condition will be described latar.

C. Height Adjustment of A/C Head

Note:
This procedure should be performed only when the A/C Head is replaced.

(Equipment Required)
Check Light (VFK0343)
Nut Driver (Purchase locally)

With the tape running, look at the lower edge of the control head by using the check light and check if the lower edge of tape runs along the lower edge of the control head.
If it doesn't,slightly turn the nut (C) behind the A/C Head (Fig. M28) to either lower or raise the A/C head so that the tape runs along the lower edge of the control head.
Turn the nut (C) clockwise to lower the head, and counter-clockwise to raise it.

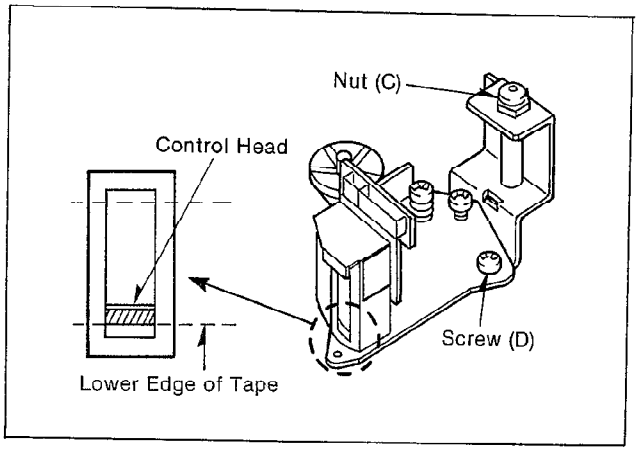


Fig. M28

D. Azimuth Adjustment of A/C Head

Note:
This procedure should be performed only when the A/C Head is replaced and posts hight are readjusted.

(Equipment Required)
Alignment Tape (VFJ8125H3F)

1. Connect the oscilloscope to the audio output on the rear panel.
2. Play back the 2nd portion (Normal Audio 6KHz) of the alignment tape (VFJ8125H3F).
3. Adjust the screw (D) so that the output level becomes maximum.

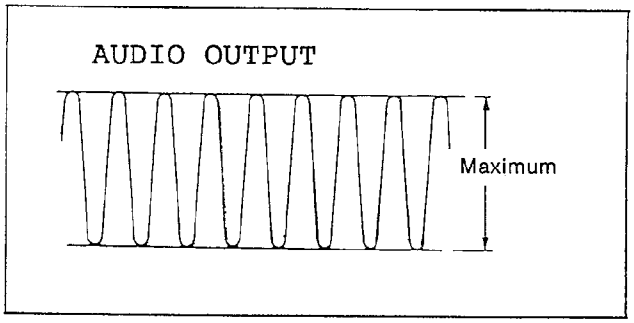


Fig. M29

E. Horizontal Position Adjustment of A/C Head

Note:
This procedure should be performed only when the A/C head is replaced, and after performing the tape interchangeability adjustment.

(Equipment Required)
H-Position Adjustment Screwdriver (VFK0328/Tool Kit: VFK0283)
Alignment Tape (VFJ8125H3F)

1. Set the Tracking Control VR to the centre fix position.
2. Connect the oscilloscope to the output of Head Amp. (Refer to Fig. M20)
3. Play back the alignment tape (VFJ8125H3F).
4. Adjust the Horizontal Position Screw of A/C head so that the RF signal becomes maximum level.

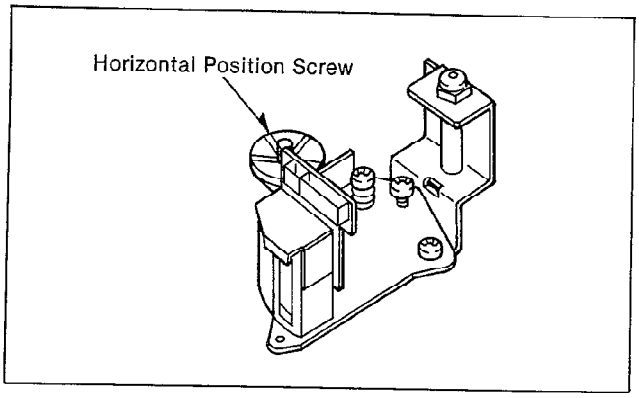


Fig. M30

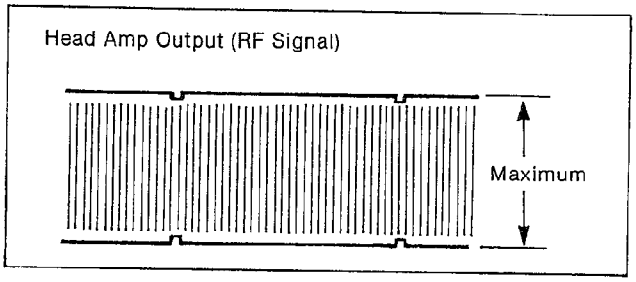


Fig. M31

2-4 ASSEMBLY AND ADJUSTMENT PROCEDURES OF MECHANISM

The mechanism of this model is mostly engaged to the System Control Circuit, through the mode select switch.
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And it will result being damaged at any mechanical or electrical parts.
The overall mechanical condition (alignment) of bottom and top view are shown in Fig. A1 and Fig. A2. This mechanical adjustment is Performed in STOP mode.
The detail of mechanical condition will be described latar.

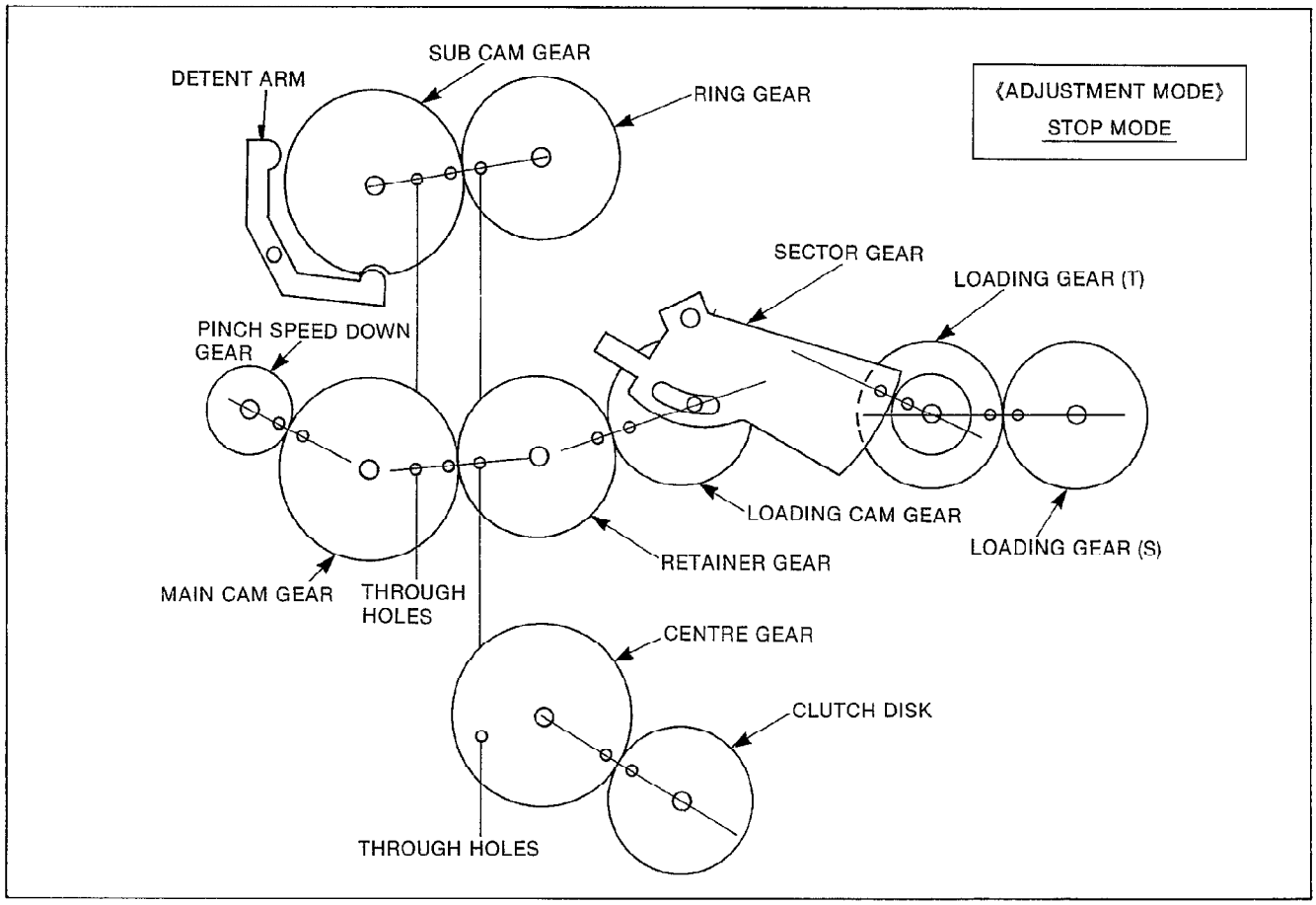


Fig. A1 Bottom View of Overall Mechanical Condition

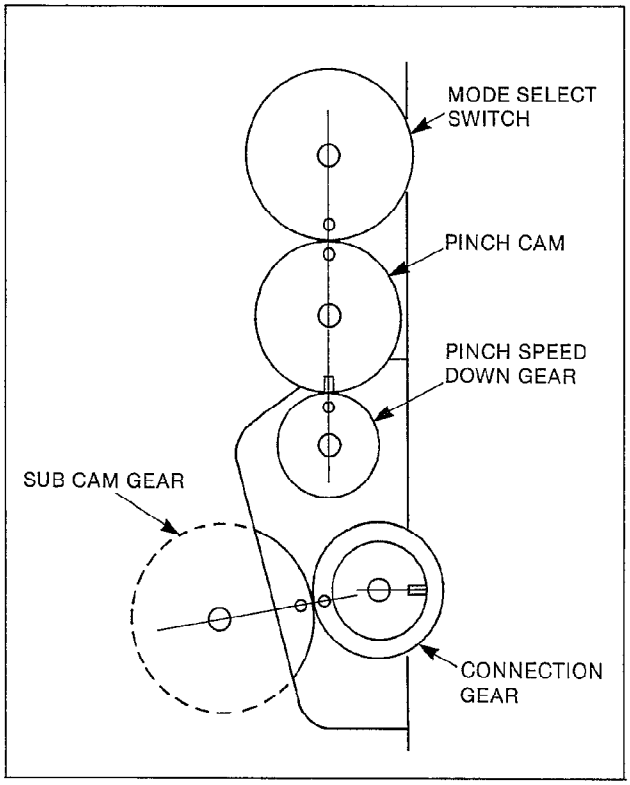


Fig. A2 Top View of Overall Mechanical Condition

2-4-1. ASSEMBLY PROCEDURES OF SUB CAM GEAR, RING GEAR AND DETENT ARM

1. Install the Ring Gear so that the hole of Ring Gear is exactly in line with the hole of chassis as shown Fig. A3.
2. Install the Sub Cam Gear so that the hole of Sub Cam Gear is exactly in line with the hole of chassis, at the same time, the small hole (located just outside of large hole) of Sub Cam Gear is exactly in line with the hole of Ring Gear.
3. Install the Detent Arm.

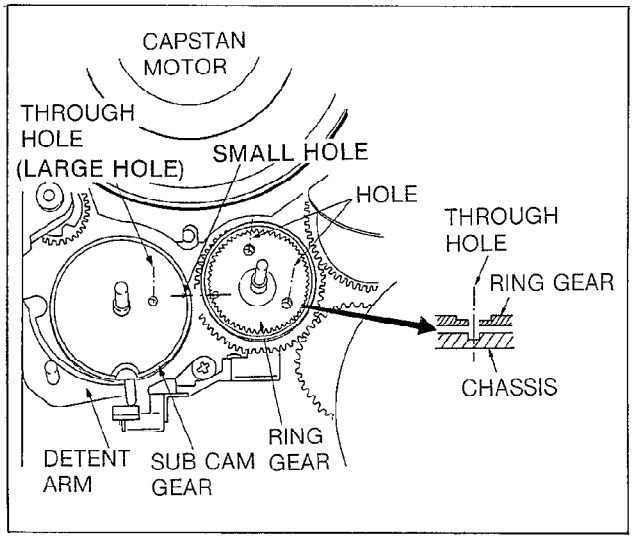


Fig. A3

2-4-2. ASSEMBLY PROCEDURES OF MAIN CAM GEAR AND PINCH SPEED DOWN GEAR

1. Install the Pinch Speed Down Gear from top side of chassis.
2. Install the Main Cam Gear on to the Sub Cam Gear so that the small hole of Main Cam Gear is exactly in line with the small hole of Pinch Speed Down Gear.
   And the large hole of Main Cam Gear is exactly in line with the large hole of Sub Cam Gear as shown in Fig. A4.

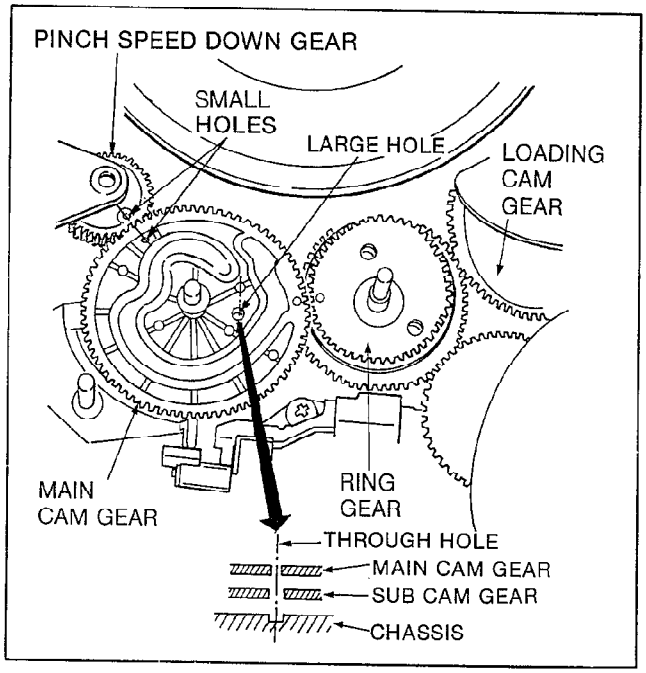


Fig. A4

2-4-3. ASSEMBLY PROCEDURES OF LOADING CAM GEAR AND RETAINER GEAR

1. Install the Loading Cam Gear so that the end of Sub Loading Arm comes to the rift (A) of Loading Cam Gear as shown in Fig. A5.

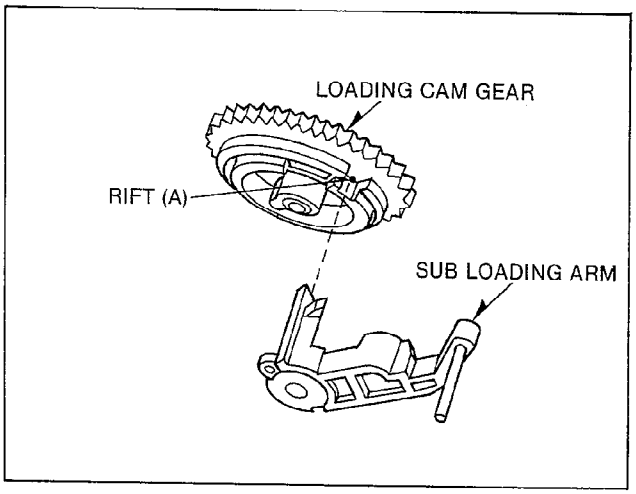


Fig. A5

2. Install the Retainer Gear on to the Ring Gear so that the hole of Retainer Gear is exactly in line with the hole of Main Cam Gear, at this time, this hole of Retainer Gear also is exactly in line with the hole of Ring Gear.
   At the same time, another hole of Retainer Gear is exactly in line with the hole of Loading Cam Gear as shown in Fig. A6.

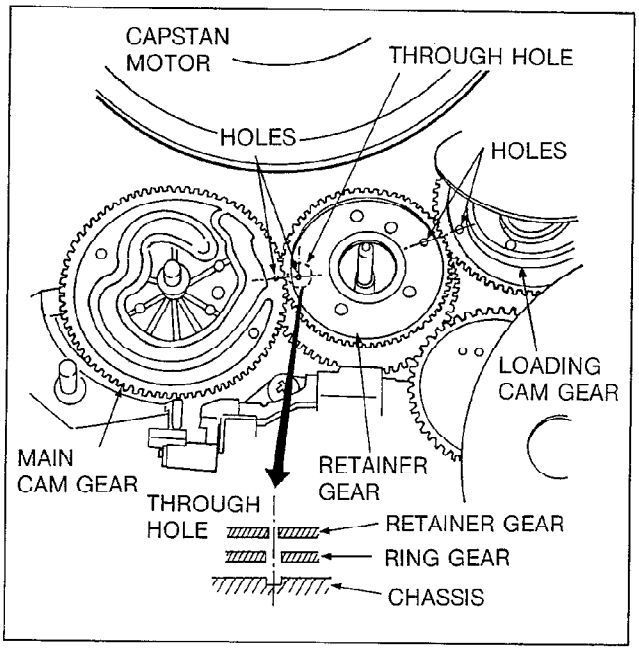


Fig. A6

2-4-4. ASSEMBLY PROCEDURES OF CENTRE GEAR

1. Install the Centre Gear on to the Retainer Gear so that the hole of Center Gear is exactly in line with the hole of Retainer Gear, at this time, another hole of Center Gear is exactly in line with the small hole of Clutch Disk, then insert the cut washer.

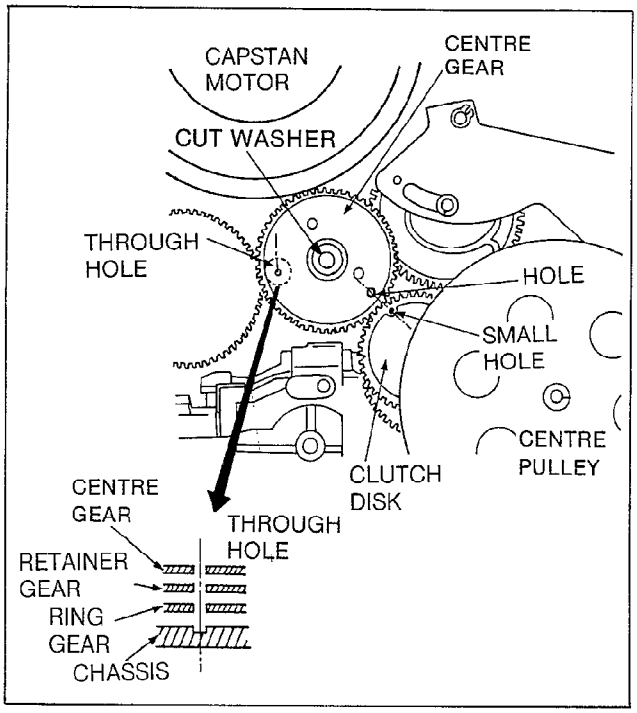


Fig. A7

2-4-5. ASSEMBLY PROCEDURES OF MAIN LEVER (1) UNIT AND CAM FOLLOWER ARM UNIT

1. Install the Cam Follower Arm Unit so that the pin of Cam Follower Arm insert to the groove of Main Cam Gear then insert a retaining ring.
2. Install the Main Lever (1) Unit and then insert the cut washers as shown in Fig. A8.

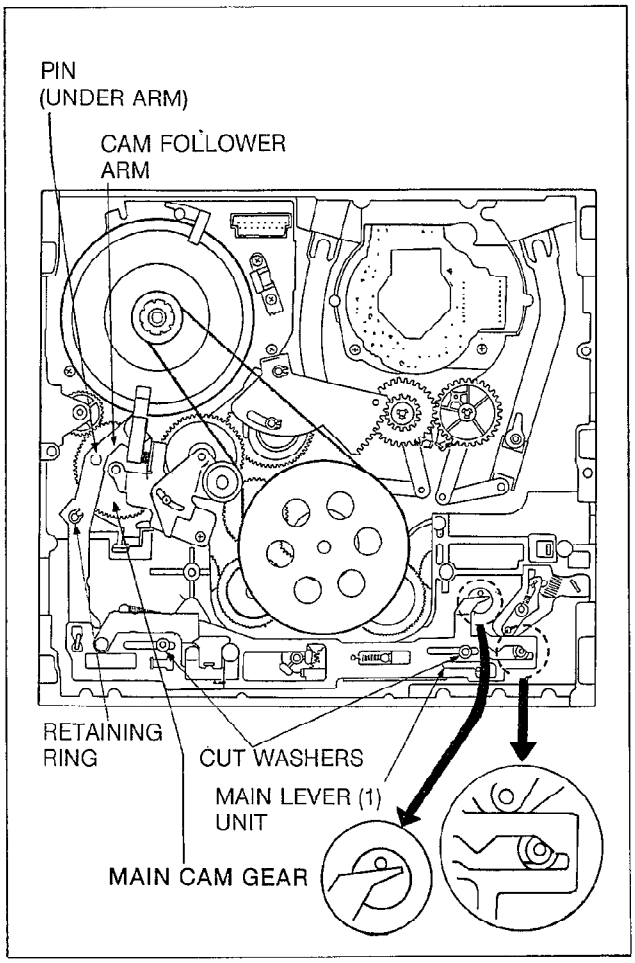


Fig. A8

2-4-6. ASSEMBLY PROCEDURES OF LOADING GEAR (T), LOADING GEAR (S), SECTOR GEAR, TENSION ROLLER UNIT AND SS BRAKE ARM UNIT

1. Set the P2 and P3 posts to unloading position, then install the Loading Gear (T) and (S) so that the hole of Loading Gear (T) is exactly in line with the hole of Loading Gear (S).
2. Install the Sector Gear so that the hole of Sector Gear is exactly in line with the projection mark of Loading Gear (T). Then insert the retaining rings.
3. Install the Tension Roller Unit and SS Brake Unit, then taighten the screws.

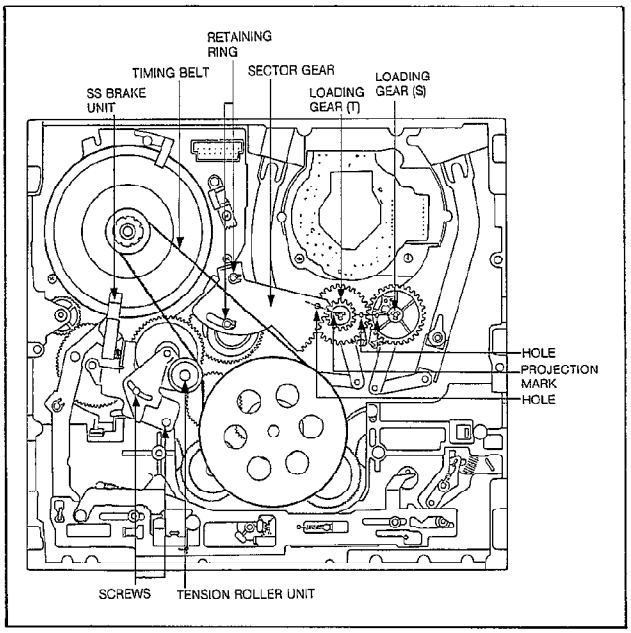


Fig. A9

2-4-7. ASSEMBLY PROCEDURES OF CONNECTION GEAR

Note:
Before this assembling, Sub Cam Gear position (and positions of bottom side gears) must be in correct positions as described before.
Install the connection gear so that the small hole of connection gear is exactly in line with the small hole of Sub Cam Gear as shown in Fig. A10.

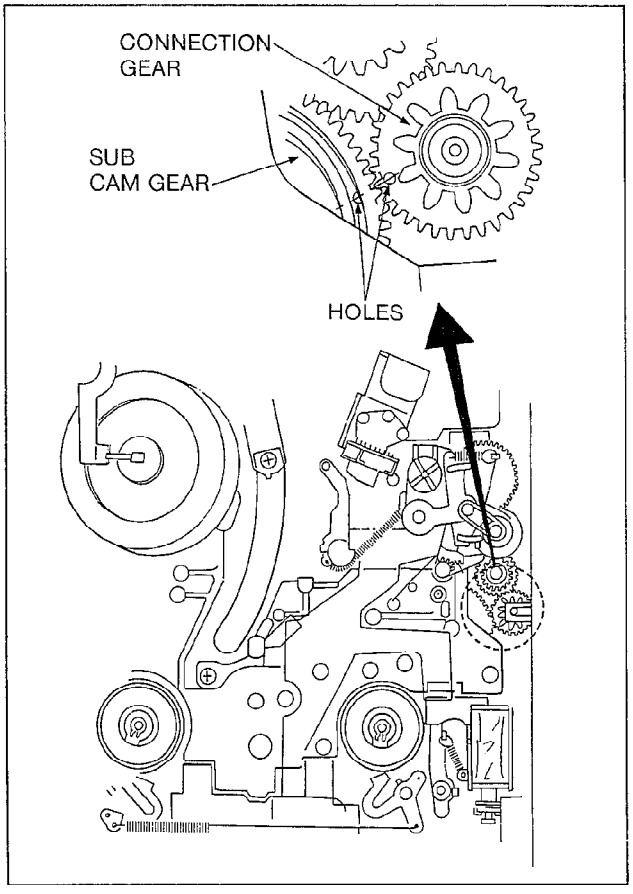


Fig. A10

2-4-8. ASSEMBLY PROCEDURES OF MODE SELECT SWITCH AND P5 PULL OUT SECTOR GEAR

1. Install the Mode Select Switch and tighten a screw, then solder the 5 soldering portions.
2. Install the P5 Pull Out Sector Gear so that the hole of P5 Pull Out Sector Gear is exactly in line with the tip of edge at P5 gear as shown in Fig. A11.

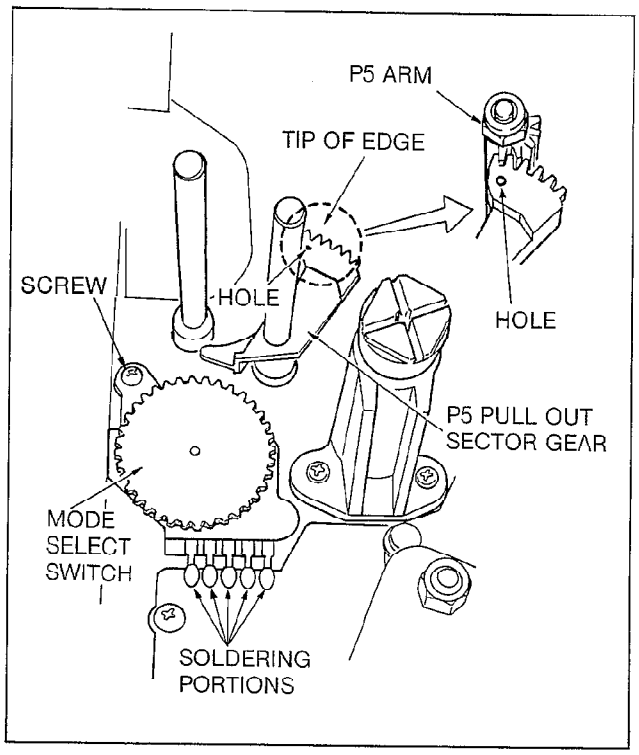


Fig. A11

2-4-9. ASSEMBLY PROCEDURES OF PINCH CAM AND PRESSURE ROLLER UNIT

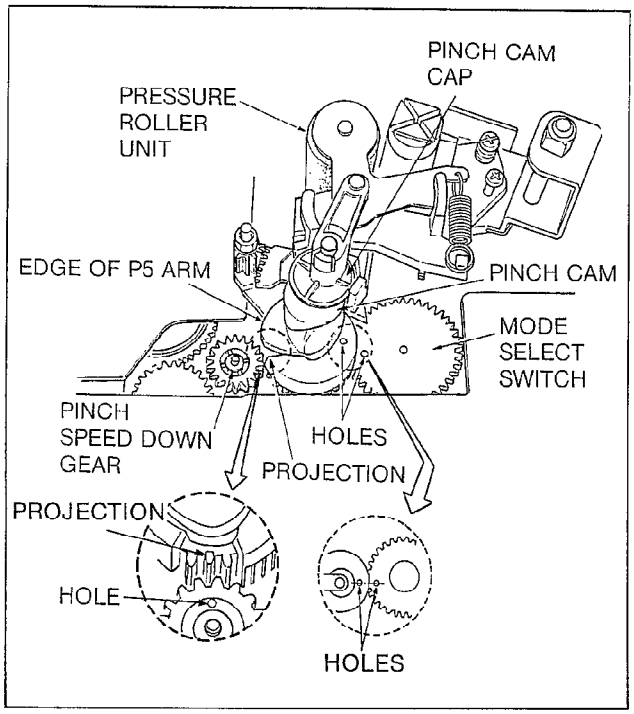


Fig. A12

1. Install the Pinch Cam so that the edge of P5 Arm comes into the Rift of Pinch Cam and Projection of Pinch Cam is exactly in line with the hole of Pinch Speed Down Gear, at this time, the hole of Mode Select Switch is exactly in line with the hole of Pinch Cam as shown in Fig. A12.
2. Install the Pressure Roller Unit, then install the Pinch Cam Cap.

2-4-10. REINSTALLATION OF CASSETTE COMPARTMENT

When reinstall the cassette compartment, the position adjustment (alignment) of mechanism is necessary for correct working as follows.

1. Press the change Lever to the direction indicated by arrow mark as shown in Fig.A13 (to release the lock).
2. Turn the Capstan Motor counter clockwise until mechanism is placed to Eject position fully (until mechanism come to final position) and keep this position.

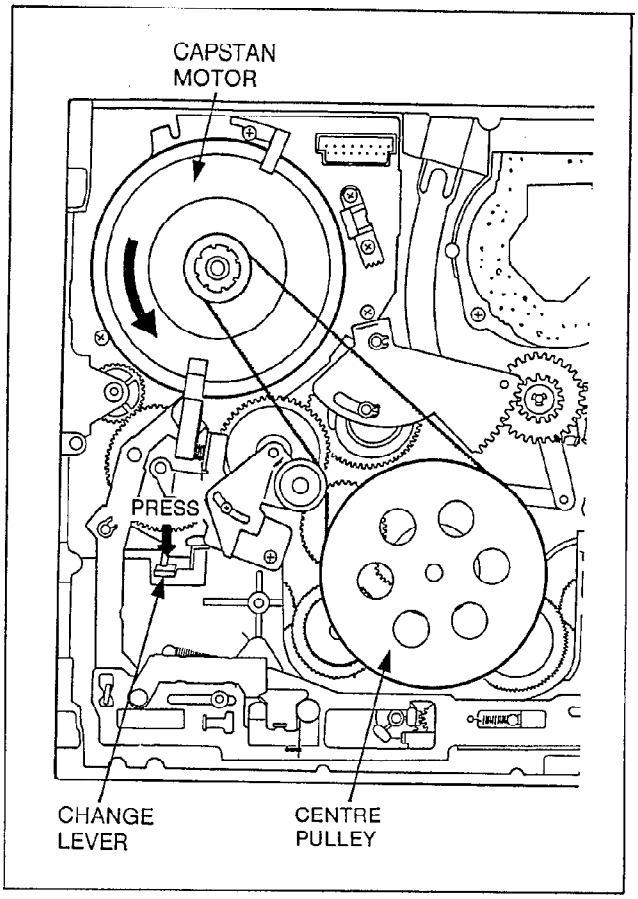


Fig. A13

3. Memorize the position of marking or hole on the Connection Gear (located top view ,right side as shown in Fig.A14) and turn the Capstan Motor to counter clockwise so that marking or hole of Connection Gear return to just one rotation back and keep this position.

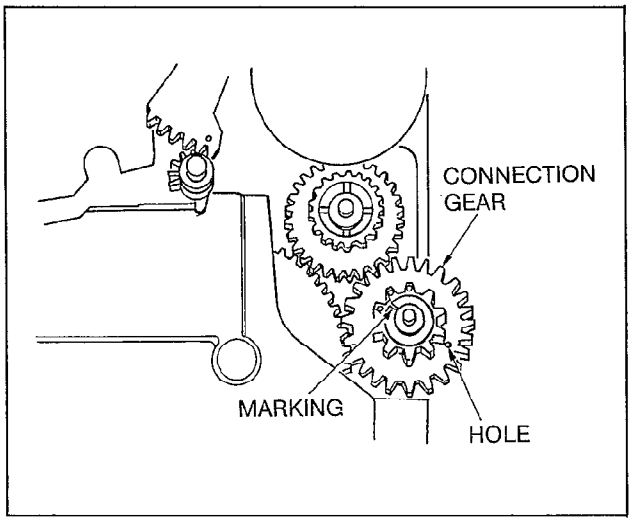


Fig. A14

4. Slide the cassette holder just a little so that second tip of Rack A (1) Gear (located bottom view,right side of cassette compartment) come to centre of rectangular hole as shown in Fig.A15.
5. Remove the 2 screws (A) and carefully remove the top plate from the cassette compartment. (so that Connection Gear and Rack A (1) Gear can be seen when reinstalling).
6. Install slowly the cassette compartment to chassis so that the second tip of Rack A (1) Gear comes into the fifth slot of Connection Gear as shown in Fig.A16. If it is not ,slide the cassette holder a little bit for correct position

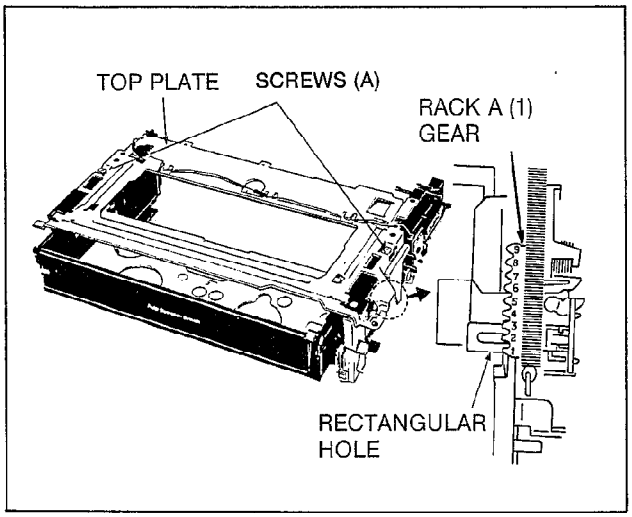


Fig. A15

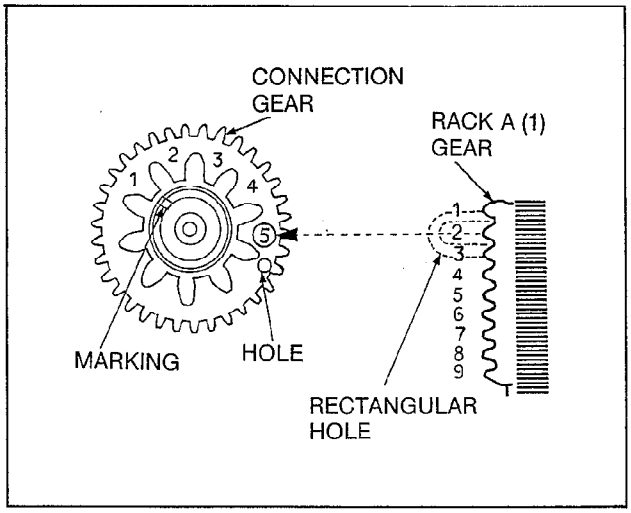


Fig. A16

7. Reinstall the top plate and tighten the 2 screws (A) ,then tighten the 4 screws (B) and (C) as shown in Fig.A17.
Re-connect the flexible cable to P1503.

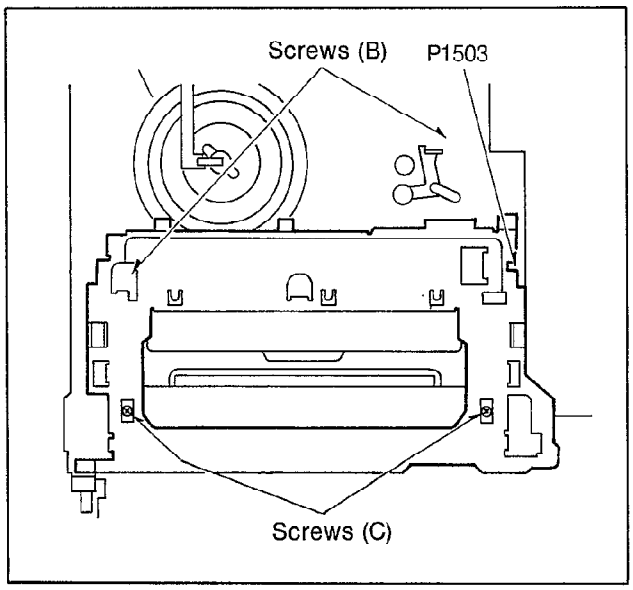
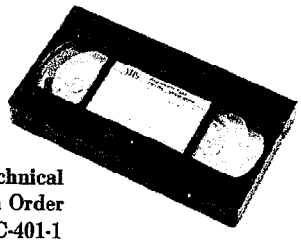


Fig. A17

Note:
If mechanism does't work correctly,carefully repeat 1~7 in item 2-4-10 Reinstallation of cassette compartment.

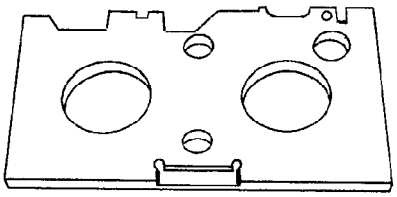
Servicing Fixtures & Tools

VFJ8125H3F VHS Alignment Tape

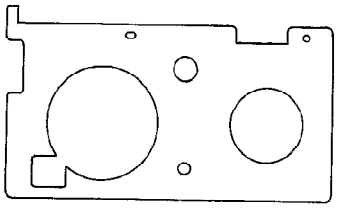


Refer to Technical Information Order No. VRD-TC-401-1

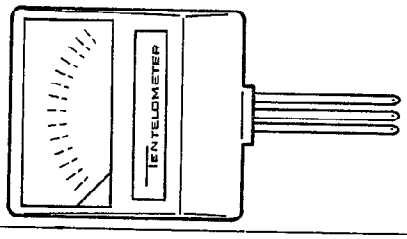
VFK0191 Post Adjustment Plate



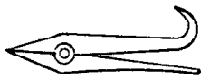
VFK0387 Tension Post Adj. Fixture



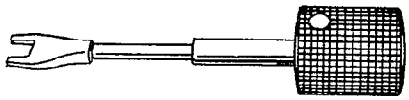
VFK0132 Back Tension Meter (Tentelometer, Made in U.S.A.)



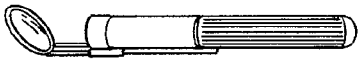
VFK0335 Retaining Ring Remover (3mm/4mm)



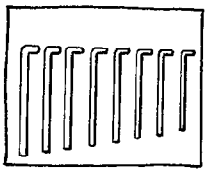
VFK0328 H-Position Adj. Screwdriver



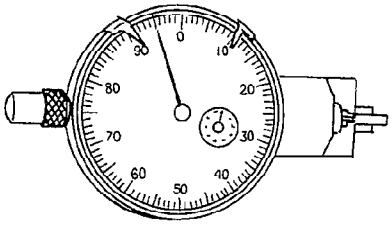
VFK0343 Check Light



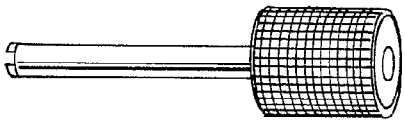
VFK0326 Hex. Wrench Set (0.7, 0.9, 1.2, 1.5, 1.6, 2, 2.4, 3mm)



VFK0190 Reel Table Height Jig

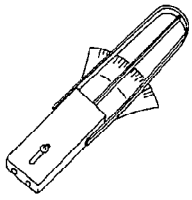


VFK0329 Post Adjustment Screwdriver

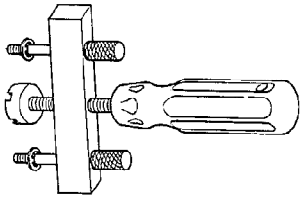


VFK0344 Height Adjustment Jig

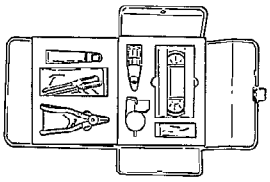
VFK62 Fan Type Tension Gauge



VFK0341 Upper Cylinder Remover Jig

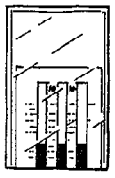


VFK0283 Tool Kit

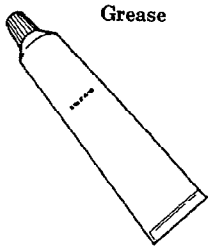


Refer to Technical Information Order No. VRD-TC-402-3

VFK27 Head Cleaning Stick



MOR265 Morlytone Grease



2-5. ELECTRICAL ADJUSTMENT PROCEDURES

This section provides complete electrical adjustment procedures which may be required for electronic circuits of VHS video Cassette Recorders NV-G20.

2-5-1. TEST EQUIPMENTS

To perform the electrical adjustments completely, following equipments are required.

1. VTVM (Vacuum Tube Volt Meter) or DVM (Digital Volt Meter)
   Voltage Range: 0.001~50V
2. Dual-Trace Oscilloscope
   Voltage range: 0.005~50V/div.
   Frequency Range: DC~30MHz
   Probes: 10:1
3. Frequency counter
   Frequency Range: 0~10MHz
4. Signal Generator (Sinewave)
   Frequency Range: 0~500KHz
5. Video Sweep Generator
   Frequency Range: 0~10MHz
6. Colour Monitor TV
7. Plaastic Tip Driver
8. VHS Alignment Tape (VFJ8125H3F)
9. Pattern Generator

2-5-2. HOW TO READ THE ADJUSTMENT PROCEDURES

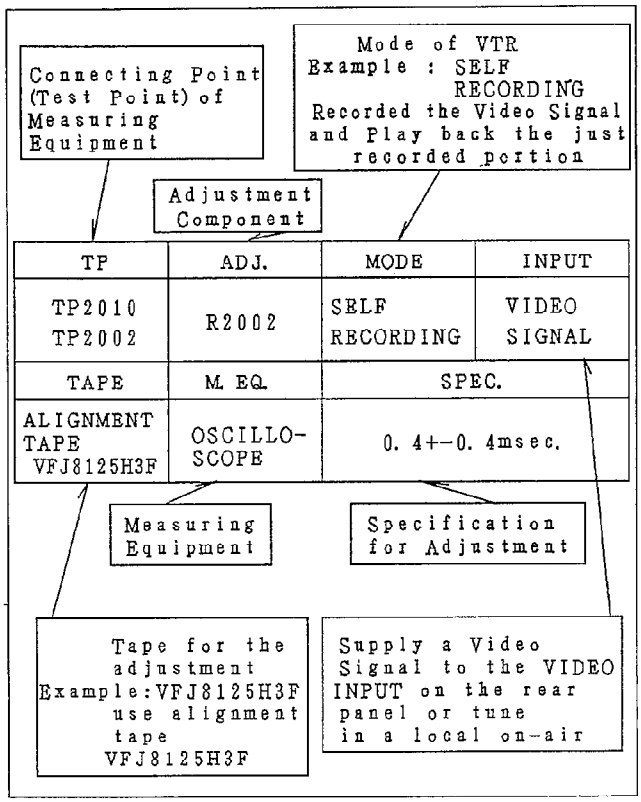


Fig. E1

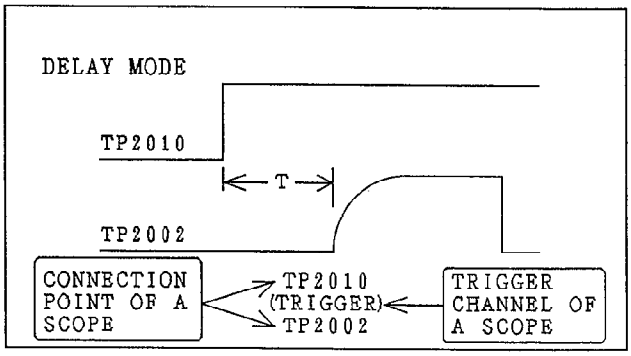


Fig. E2

Note:
Before the electrical adjustment, set the VHS VTR as following conditions except for especial instructions in each adjustment item.

1) Tracking Control VR --- Centre FIX Position
2) Picture Sharpness VR --- Centre FIX Position
3) RF Signal Level SW --- HIGH
4) Colour Mode/Test Signal SW --- AUTO (NV-G20A/EA) --- COLOUR (NV-G20EN)
5) Timer Record Button --- OFF
6) EDIT SW --- OFF
7) Oscilloscope-Probe --- 10:1 Probe

SERVO SECTION

2-5-3. PG SHIFTER ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2001 TP3002	VR2001	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
ALIGNMENT TAPE VFJ8125H3F	OSCILLO-SCOPE	6.5±0.5H	

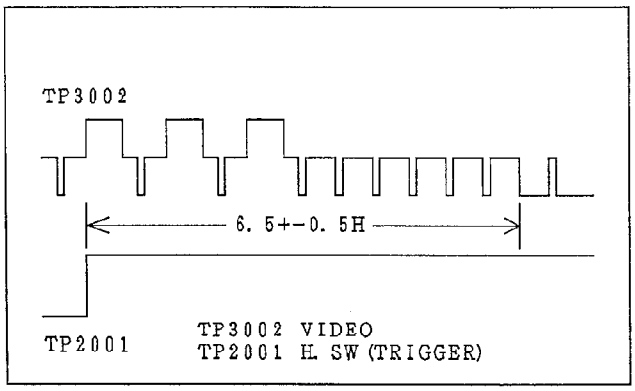


Fig. E3

2-5-4. TRACKING FIX ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2001 TP2002	VR2002	SELF RECORDING	VIDEO SIGNAL
TAPE	M. EQ.	SPEC.	
BLANK TAPE	OSCILLO-SCOPE	T=1.6±0.4msec.	

1. TRACKING VR is in centre fix position.
2. Record video signal.
3. Playback the just recorded portion.
4. Adjust VR2002 so that the period of "T" becomes 1.6 +− 0.4msec as shown in Fig.E4.

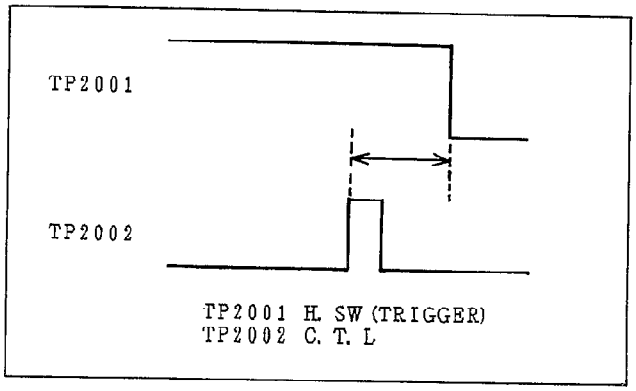


Fig. E4

2-5-5. SLOW TRACKING ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2015	VR2013	STILL	VIDEO SIGNAL
TAPE	M. EQ.	SPEC.	
BLANK TAPE	FREQUENCY COUNTER	453±15Hz	

1. Record video signal and play back the tape just recorded.
   Then place the unit in STILL mode.
2. Connect the jumper wire between TP2025 and GND.
3. Connect the jumper wire between TP2026 and GND.
4. Connect the frequency counter to TP2015.
5. Adjust the VR2013 so that the frequency is 453 +− 15Hz.

2-5-6. SLOW TRACKING ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2020 TP2002	VR2011	SLOW	VIDEO SIGNAL
TAPE	M. EQ.	SPEC.	
BLANK TAPE	OSCILLO-SCOPE	T=21.5±2.0msec.	

1. SLOW TRACKING VR is in centre fix position.
2. Play back the just recorded portion in SLOW mode.
3. Adjust VR2011 for 21.5 +− 2.0msec as shown in Fig. E5.

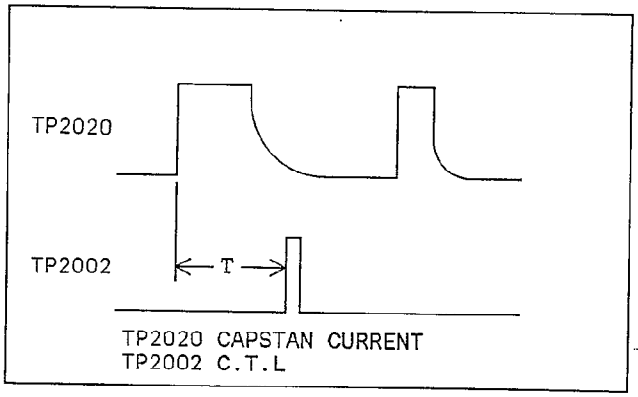


Fig. E5

2-5-7. ARTIFICIAL V-SYNC ADJUSTMENT

TP	ADJ.	MODE	INPUT
TV MONITOR	VR2010	SELF RECORDING	VIDEO SIGNAL
TAPE	M. EQ.	SPEC.	
BLANK TAPE	TV MONITOR		

1. Play back the just recorded portion and place the unit in STILL mode.
2. Adjust VR2010 on the Servo pack (VEP02266A) so that the V-dancing does not appear on the TV monitor as shown in Fig. E6.
3. Confirm that the V-dancing does not appear in cue and Review modes. If the V-dancing is appeared on the TV monitor, this adjustment should be repeated again.

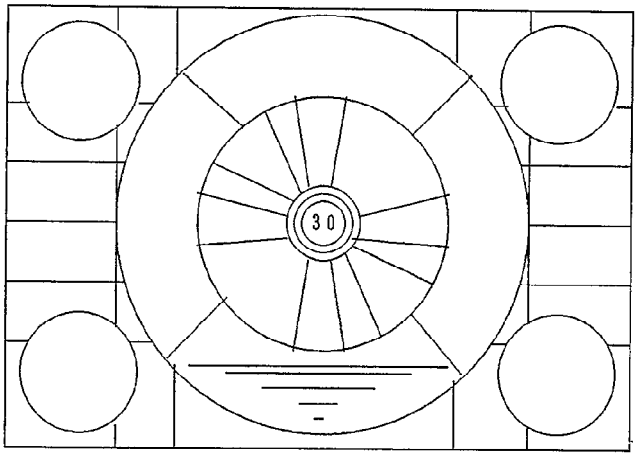


Fig. E6

LUMINANCE, CHROMINANCE & HEAD AMP SECTION

2-5-8. CHROMINANCE & LUMINANCE RECORDING CURRENT ADJUSTMENT

*CHROMINANCE RECORDING CURRENT ADJ.

TP	ADJ.	MODE	INPUT
TP503 (HOT) TP504 (GND)	VR502	RECORDING	VIDEO SIGNAL (COLOUR BAR)
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	32±3mVp-p	

1. Connect the oscilloscope to TP503 (HOT) and TP504 (GND).
2. Before chrominace recording current adjustment, Luminance recording current must be closed to observe the chrominance signal. (VR501 is minimum position.)
3. Adjust VR502 for 32 +− 3mVp−p as shown in Fig. E7.

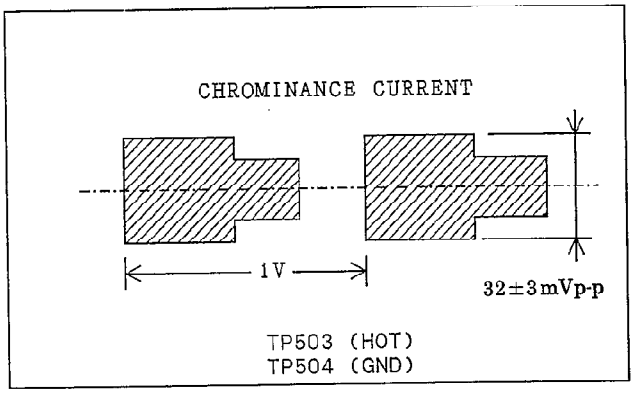


Fig. E7

*LUMINANCE RECORDING CURRENT ADJ.

TP	ADJ.	MODE	INPUT
TP503 (HOT) TP504 (GND)	VR501	RECORDING	VIDEO SIGNAL (COLOUR BAR)
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	130±5mVp-p	

4. After chrominance recording current adjustment, adjust VR501 for 130 +− 5mVp−p as shown in Fig. E8.

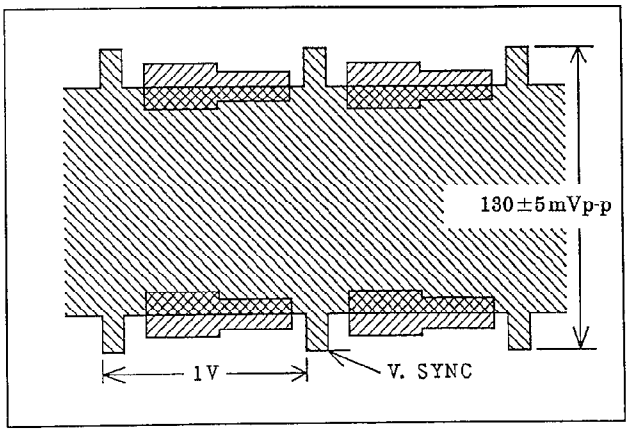


Fig. E8

2-5-9. HEAD AMP FREQUENCY RESPONCE ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3002	VR3012	SELF RECORDING	VIDEO SWEEP
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	VIDEO SWEEP/ OSCILLO-SCOPE	A=0±1dB	

Note:
Set the Colour Mode/Test Signal Switch to the "B/W". (NV-G20EN ONLY)

1. Set the sweep generator output as shown in Fig. E9.

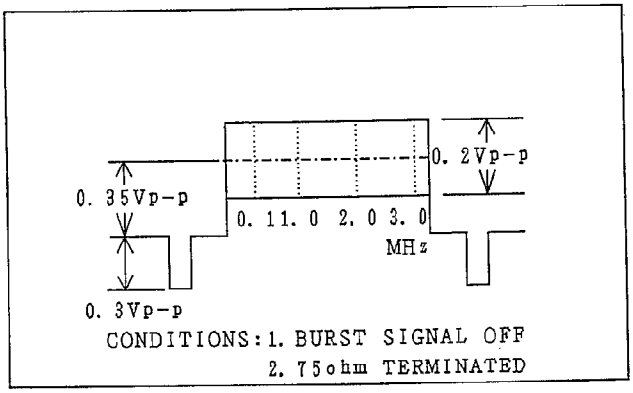


Fig. E9

2. PICTURE VR is in centre fix position.
3. Set the Edit SW (on the front pannel) for "OFF" and record the above signal.
4. Play back the just recorded portion.
5. Adjust VR3012 so that the waveform (A) becomes 0 +− 1dB comparing with 0.1MHz portion as shown in Fig. E10.

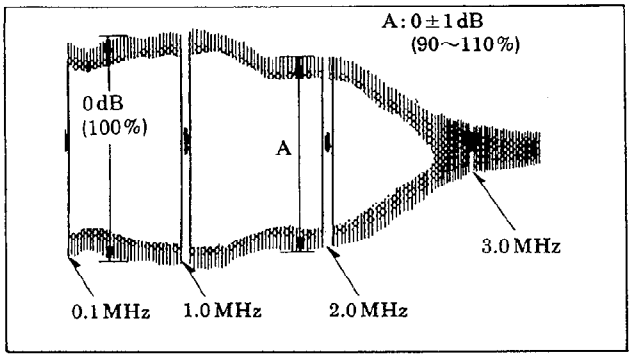


Fig. E10

2-5-10. PLAYBACK CHROMA CYAN LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3002 or LINE OUT	VR801	SELF RECORDING	VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	0.55±0.1Vp-p	

1. Play back the just recorded portion.
2. Adjust VR801 for 0.55 +-0.1 Vp-p as shown in Fig. E11.

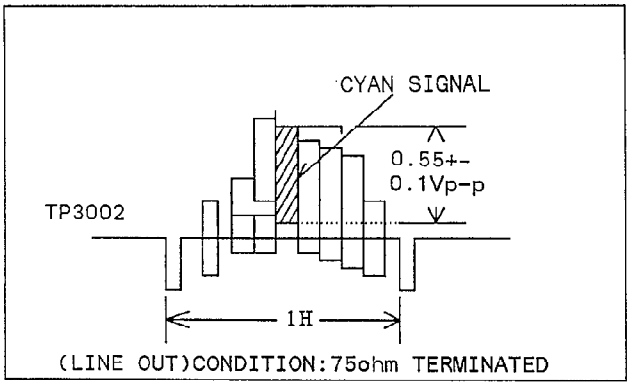


Fig. E11

2-5-11. HQ AMP GAIN ADJUSTMENT

TP	ADJ.	MODE	INPUT
Q301-(B) (CH-1) Q304-(E) (CH-2)	VR301	STOP	VIDEO SIGNAL (COLOUR BAR)
TAPE	**M. EQ.**	**SPEC.**	
	OSCILLO-SCOPE	0±30mVp-p	

1. Set the "EDIT SW" (on the front pannel) for "OFF" posisiton.
2. Connect the oscilloscope to Q301-Base (CH1) and Q304-Emitter (CH2).
3. Set the oscilloscope to "ADD" mode. And set the Porality switch of CH2 side to "INV" (Invert) mode.
4. Adjust the VR301 so that operational amplitude becomes 0 +- 30mV (minimum as possible) as shown in Fig. E12.

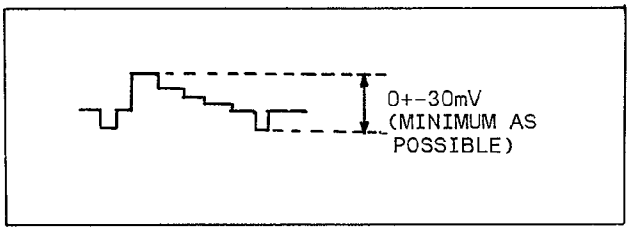


Fig. E12

AUDIO SECTION

Note:
Before the electrical adjustment in this section ,make the short circuit between Audio Input Jack and GND except for especial instructions in each adjustment item.

2-5-12. AUDIO BIAS CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP4002 (+) TP4003 (-)	VR4002	RECORDING	
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	V.T.V.M	3.2±0.1mVrms	

2-5-13. AUDIO PLAYBACK LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
LINE OUT or TP4001	VR4001	SELF RECORDING	SIGNAL GENERATOR (1kHz, 0dB)/ VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	SIGNAL GENERATOR/ V.T.V.M	E-E LEVEL=-7±2dB PLAYBACK LEVEL= E-E LEVEL ±0.5dB	

Note:
Before this adjustment,"Tape Interchangeability Adjustment" must be completed.

1. Play back the just recorded portion.
2. Adjust VR4001 volume so that the level of the playback becomes E-E level +- 0.5dB.

TIMER SECTION

2-5-14. AN ELECTRICITY FAILURE DETECTION ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP7508	VR7502		
TAPE	**M. EQ.**	**SPEC.**	
	OSCILLO-SCOPE/ 2 DC POWER SUPPLIES		

Note:
1) Do not connect the AC power plug.
2) Make a short circuit at C7518 to discharge. (refer to the Technical Information)

1. Set the voltage of the DC power supply (A) for 4.6 +− 0.05V and supply it to IC7551-8 (+) and GND (−).
2. Set the voltage of the DC power supply (B) for 45 +− 1V and supply it to JA-8 (D7555-anode side).
3. Turn the VR7502 until the voltage at TP7508 is High Level.
4. Turn the VR7502 slowly until the voltage at TP7508 is Low Level (0V).
5. Change the voltage of the DC power supply (A) from 4.6 +− 0.05V to 4.8 +− 0.05V.
6. Confirm the voltage at TP7508 is High Level.

2-5-15. TIMER CLOCK ADJUSTMENT

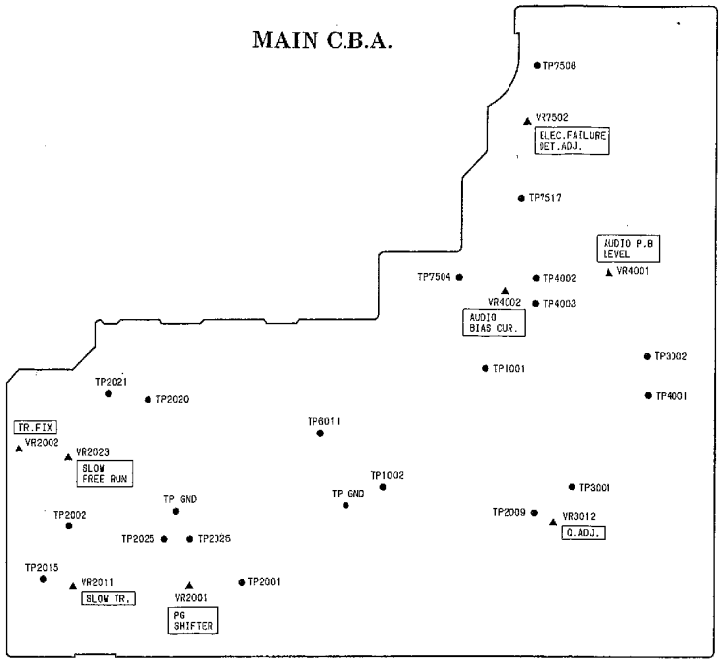
TP	ADJ.	MODE	INPUT
IC7501-37	C7502		
TAPE	**M. EQ.**	**SPEC.**	
	FREQUENCY COUNTER	3906.25±0.008μs	

Note:
1) Do not connect the AC power plug.
2) Make a short circuit at C7518 to discharge (refer to the Technical Information)

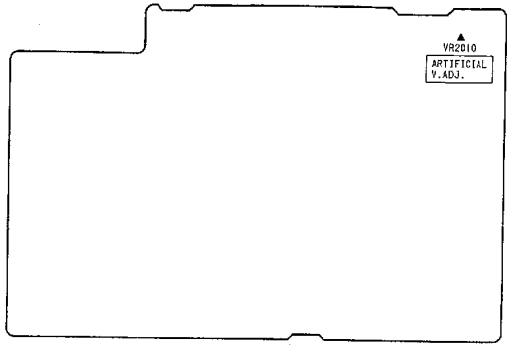
1. Set the voltage of the DC power supply for 5.8V +− 0.1V and supply it to P7501-6 (+) and GND (−).
2. Connect a jumper wire between P7501-7 and GND.
3. Connect the frequency counter to IC7501-37.
4. Adjust C7502 for 3906.25us +− 0.008us.

LOCATION OF TEST POINTS & CONTROLS — 1 —

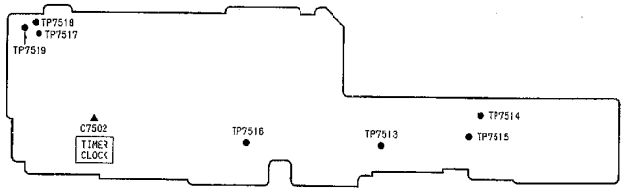
MAIN C.B.A.



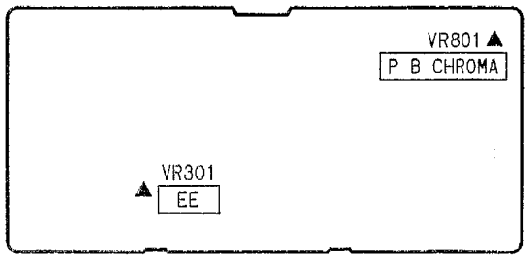
SERVO PACK C.B.A.



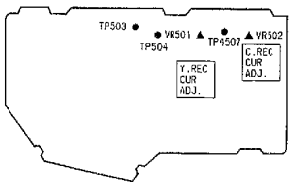
TIMER C.B.A.



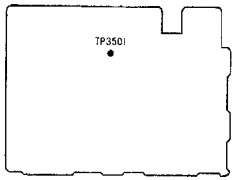
LUMINANCE & CHROMINANCE PACK C.B.A.



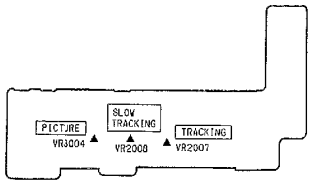
HEAD AMP PACK C B A



INPUT SELECT PACK C B A



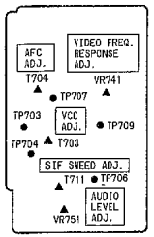
OPERATION C B A



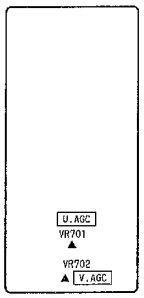
2—23

LOCATION OF TEST POINTS & CONTROLS — 2 —

TUNER/ARU PACK C B.A



TV DEMODULATOR C B A.



TV DEMODULATOR SECTION

Since different models, such as NV-G20EN, A and EA are combined into one procedure, pay attention not to adjust different specifications.

2-5-16. TEST EQUIPMENT

To make adjustment completely, following equipments are required.

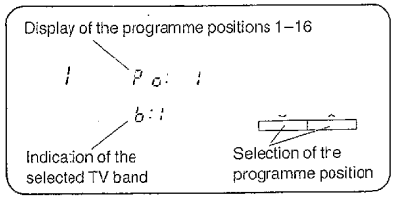
1. VIF SWEEP GENERATOR with the Trap Adjustor
   .....38.9MHz (EN/EA)
   .....36.875MHz (A)
2. SIF SWEEP GENERATOR
   .....5.5MHz +– 150KHz
3. CW OSCILLATOR
   .....38.9MHz +– 100KHz (EN/EA)
   .....36.875MHz +– 100KHz (A)
4. MONITOR SCOPE
5. OSCILLOSCOPE
6. DIGITAL VOLT METER
7. TUNING AMPLIFIER
8. MULTI VOICE MODULATOR (M.V.M)

Note:
To make this adjustment, set the Demodulator Unit as shown in Fig. E13

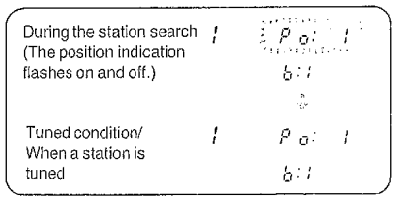
First, remove the Demodulator Unit (Tuner, RF Converter, TV Demodulator C.B.A and Tuner ARU C.B.A from the Main C.B.A (VEP03395A/B/C). Then, connect the TV Demodulator Pack pin to solder the same portiors of the Main C.B.A (VEP03395A/B/C) by lead jumper.

Note: AFC ON-OFF.
When you make AFC ON or OFF condition, set the VTR as follows.
Preparation
* Set the VTR/TV Selector to "VTR".

(1) Press the START/OFF button.
The indication on the Multi-Function Display changes from the clock indication to the position indication.
(2) Press the Channel Up or Down button to select a programme position (channel) which you want to tune to a TV station.
(3) Press the BAND/AFC button to select the "VI", "VIII" or "U" position.



(4) Press the SEARCH (+) or (–) button until the picture of the desired station on your TV is satisfactory.
* If the Search (+) or (–) buttor is pressed while pressing the Quick Button, the stations will change quickly.



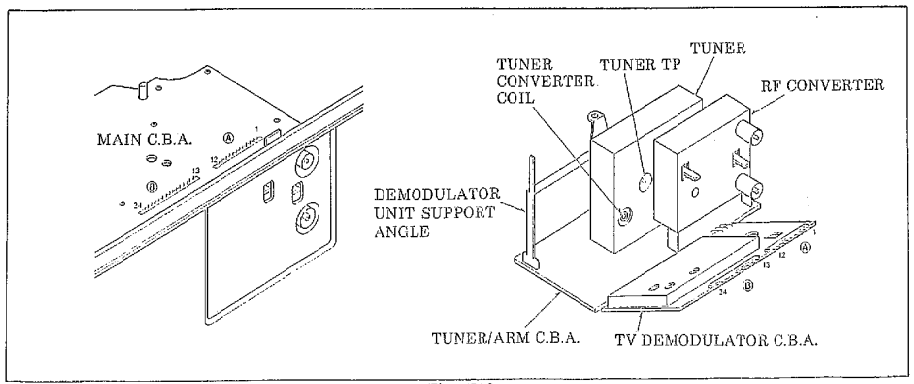


Fig. E13

(5) Press the START/OFF button again.
The indication on the Multi-Function Display changes to the clock indication.
* Now AFC is "ON" condition.
(6) Press the FINE TUNING (+) or (–) button in a moment.
* Now AFC is "OFF" condition.

2-5-17. VIF SWEEP ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP707	T703, TUNER CONVERTER COIL		VIF SWEEP
TAPE	M. EQ.	SPEC.	
	VIF SWEEP/ MONITOR SCOPE	Refer to VIF Specification chart. (Fig. E-17)	

1. Set the BAND SW for VHF position (VIII) and set the DC power supply for 15V and suplly it to BT Terminal of the Tuner after removing TV Demodulator C.B.A (VEP07348B/C)–(9), to cut off the BT voltage from IC7551–(2).
2. Set the AFC OFF condition.
3. Connect a jumper wire between AGC Terminal of the Tuner and GND.
4. Connect a capasitor (50V/1 uF) between TP703 and GND.
5. Connect the VIF sweep generator to the Tuner Test Point and connect the monitor scope to TP707 as shown in Fig. E14.

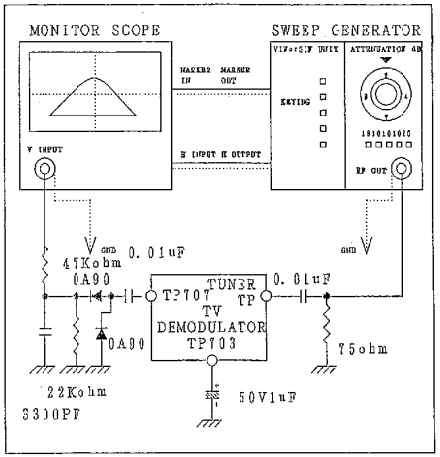


Fig. E14

6. Adjust the output of the VIF sweep generator so that the sweep wave becomes 0.3Vp-p on the monitor scope.
7. Release the attenuator of the VIF sweep generator for 20dB.
8. Connect the Jig to both points TP709 and TV Demodulator C.B.A–(6).

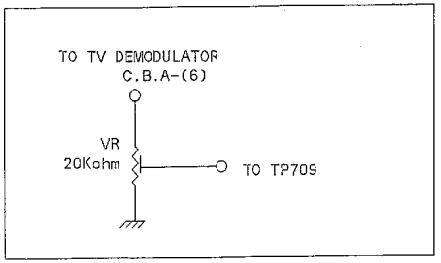


Fig. E15

9. Adjust the VR of the Adjustment Jig so that the sweep wave becomes 0.3Vp-p on the monitor scope.
10. Adjust T703 so that the VCO beat is placed to centre of waveform as shown in Fig.E16.

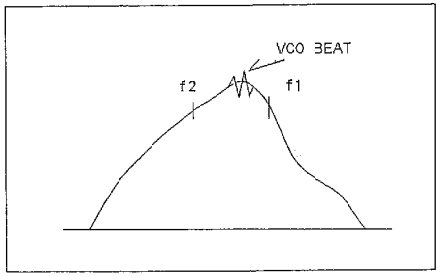
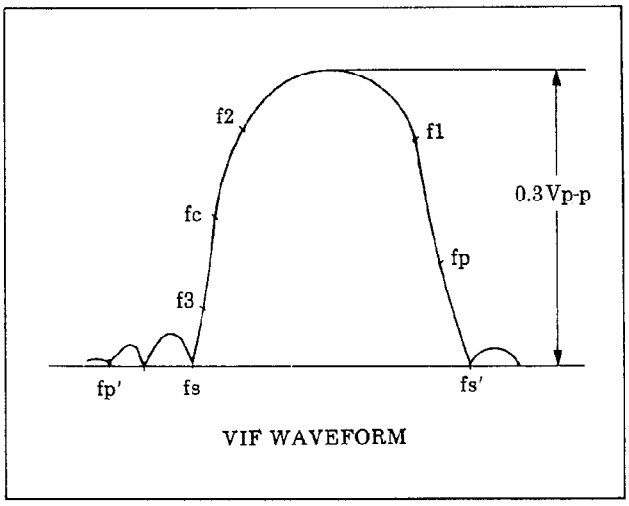


Fig. E16

11. Readjust the VR of the Adjustment Jig so that the sweep wave becomes 0.3Vp-p on the monitor scope.
Adjust the T703 so that the waveform becomes as follows.
12. Preadjust the Tuner Converter Coil so that the sweep output waveform becomes maximum and then adjust the Tuner Converter Coil so that the waveform becomes as follows.

MODEL NO.		EN/EA	A
MARKER FREQUENCY	fs'	40.4MHz	38.375MHz
	fp	38.9MHz	36.875MHz
	f1	38.15MHz	36.125MHz
	f2	35.22MHz	33.195MHz
	fc	34.47MHz	32.445MHz
	f3	33.97MHz	31.945MHz
	fs	33.4MHz	31.375MHz
	fp'	31.9MHz	29.875MHz
SPECIFICATIONS	fp	25±5%	
	f1	60~90%	
	f2	60~90%	
	fc	30~50%	
	f3	5~20%	

Fig. E17



VIF WAVEFORM

Fig . E18

2-5-18. VCO ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP704	T703		
TAPE	**M. EQ.**	**SPEC.**	
	FREQUENCY COUNTER/ TUNING AMPLIFIER	36.875MHz±10kHz (A) 38.9MHz±10kHz (EN/EA)	

1. Connect a Resistor (1Kohm) between TP709 and GND.
2. Connect the frequency counter to TP704 through the tuning amplifier.
3. Adjust T703 so that the reading of frequency counter is 38.9MHz +– 10KHz (EN/EA) or 36.875MHz +– 10KHz (A).

2-5-19. AFC ADJUSTMENT

TP	ADJ.	MODE	INPUT
AFC TERMINAL OF THE TUNER	T704		CW SIGNAL (1Vrms)
TAPE	**M. EQ.**	**SPEC.**	
	CW OSCILLATOR/ D.V.M.	A= 38.9MHz (EN/EA) A= 36.875MHz (A)	

1. Set the BAND SW for the VHF position (VIII) and set the DC power supply for 15 +– 1V and supply it to BT Terminal of the Tuner after removing TV Demodulator C.B.A(VEP07348B/C)–(9) to cut of the BT voltage from IC7551–(2).
2. Set the CW oscillator output for "A" MHz and 1Vrms. Connect the CW oscillator output to the Tuner Test Point.
3. Connect the D.V.M. to the AFC terminal of the tuner.
4. Read the value "B" of the D.V.M., when the AFC is OFF condition.
5. Set the AFC ON condition and adjust T704 for "B" +– 0.3V.
6. Change the frequency of the CW oscillator to "A" (MHz) +– 100KHz, and confirm the difference of the AFC voltage is more than +–2V

2-5-20. SIF SWEEP ADJUSTMENT

TP	ADJ.	MODE	INPUT
AUDIO OUT (TV DEMODU-LATOR C.B.A.-(15))	T711 VR751		SIF SWEEP
TAPE	**M. EQ.**	**SPEC.**	
	VIF SWEEP/ MONITOR SCOPE	A=5.5MHz	

1. Set the DC power supply for 15 +– 1V and supply it to BT Terminal of the Tuner after removing TV Demodulator C.B.A (VEP07348B/C)–(9) to cut of the BT voltage from IC7551 –
2. Set the AFC OFF condition.
3. Connect the SIF sweep generator to TP706 and connect the monitor scope to TV Demodulator C.B.A–(15) as shown in Fig. E19.

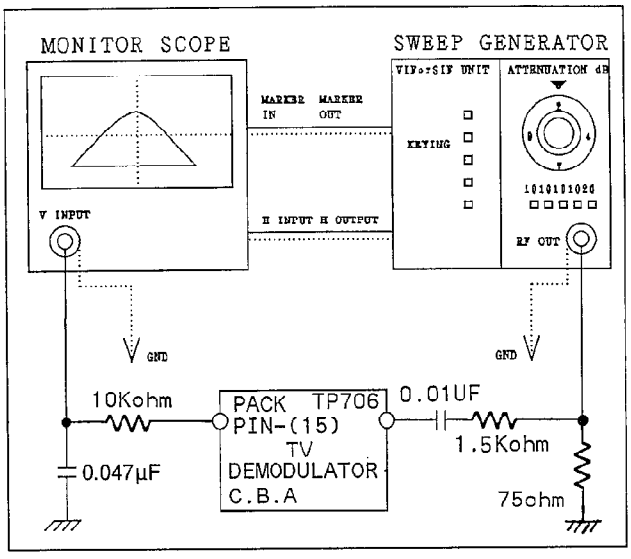


Fig . E19

4. Connect the Jig to both points TP709 and TV Demodulator C.B.A-(6).
Adjust the VR of the Jig so that the DC level becomes less than 3V.

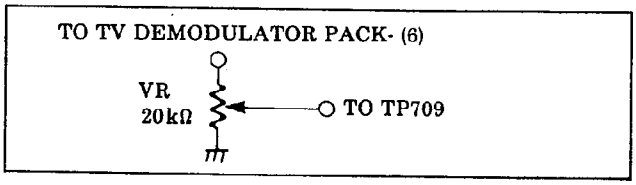


Fig . E20

5. Set the output of SIF sweep generator for 250mVrms at no load.
6. Adjust VR751 so that the SIF waveform becomes center.
7. Adjust T711 so that the attenuation of (A) trap becomes minimum.
And adjust for maximum peak-to- peak amplitude of response "S" curve as shown in Fig. E21.

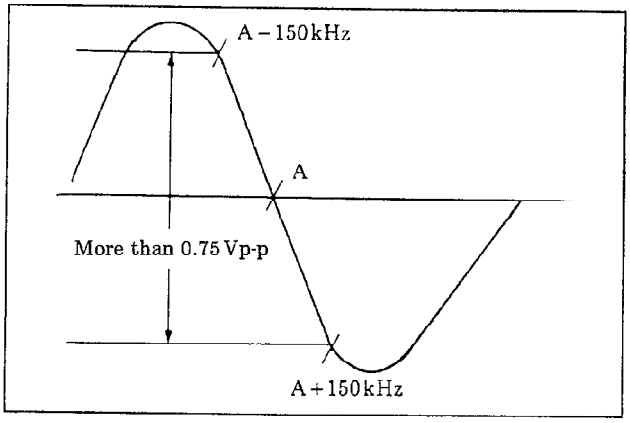


Fig. E21

8. Comfirm that the level between (A) +- 150KHz marker position is more than 0.75Vp-p.

2-5-21. VIDEO FREQUENCY RESPONSE ADJUSTMENT

TP	ADJ.	MODE	INPUT
TV DEMODU-LATOR C.B.A.-(13)	VR741		VIDEO SWEEP V. MOD: 70%, 75dBμ
TAPE	**M. EQ.**	**SPEC.**	
	OSCILLO-SCOPE/ VIDEO SWEEP/ M.V.M		

1. Supply a video sweep signal from the Video sweep generator to the input of the M.V.M.
2. Connect the output of the M.V.M to RF Input of the Deck.
3. Press the SEARCH (+) or (-) button so that the modulated RF signal on the channel 10 (NV-G20EN/EA) or 7 (NV-G20A) is able to receive.
4. Set the AFC ON condition.
5. Adjust VR741 so that the waveform at the Video out (TV Demodulator C.B.A-(13)) becomes as shown in Fig. E22.

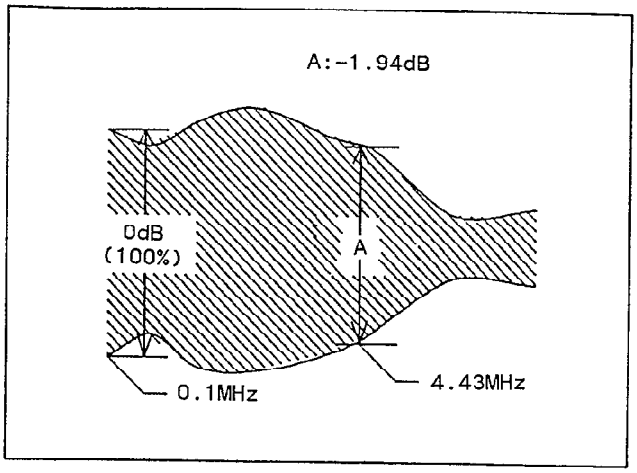


Fig. E22

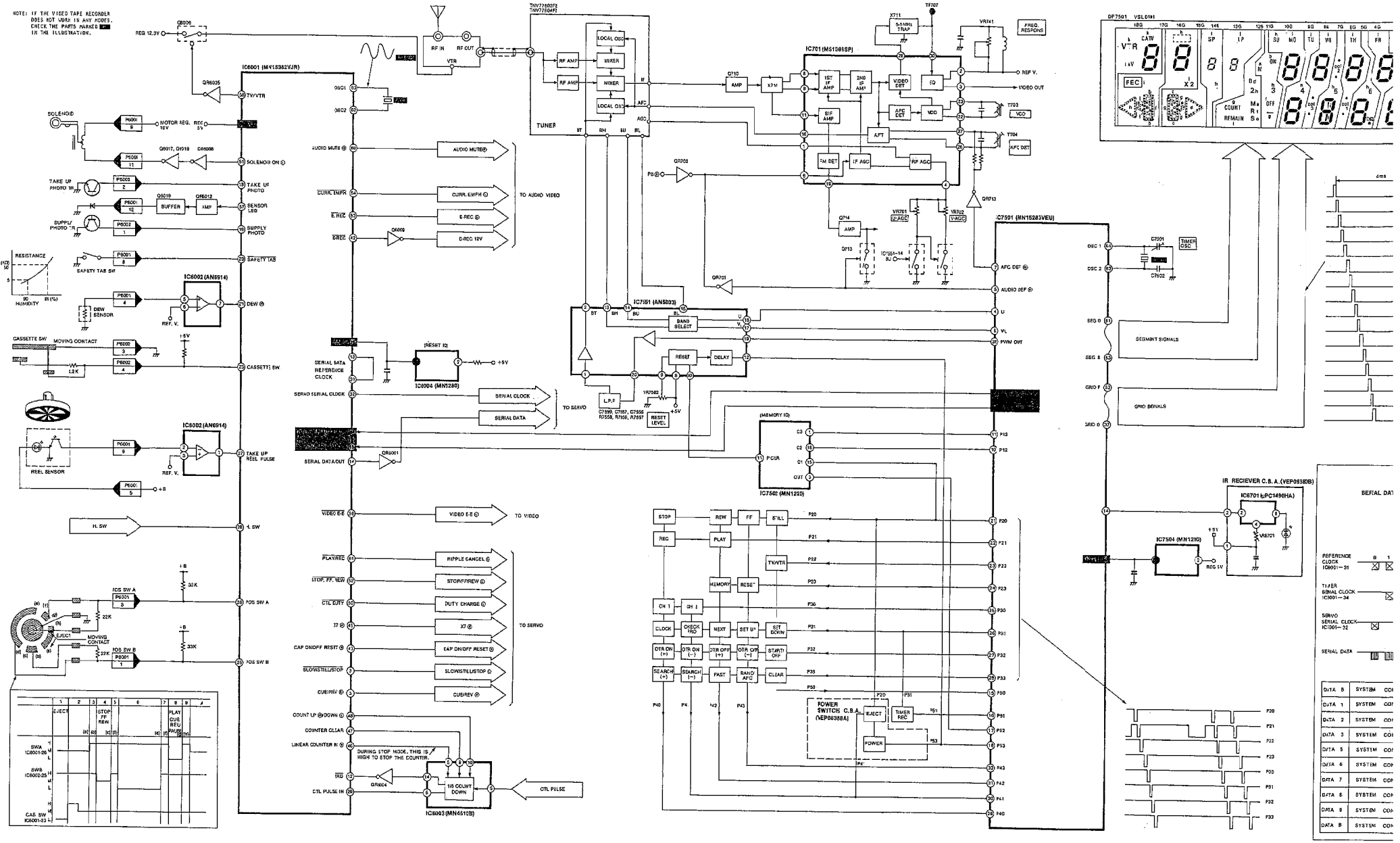
2-5-22. AUDIO LEVEL ADJUSTMENT

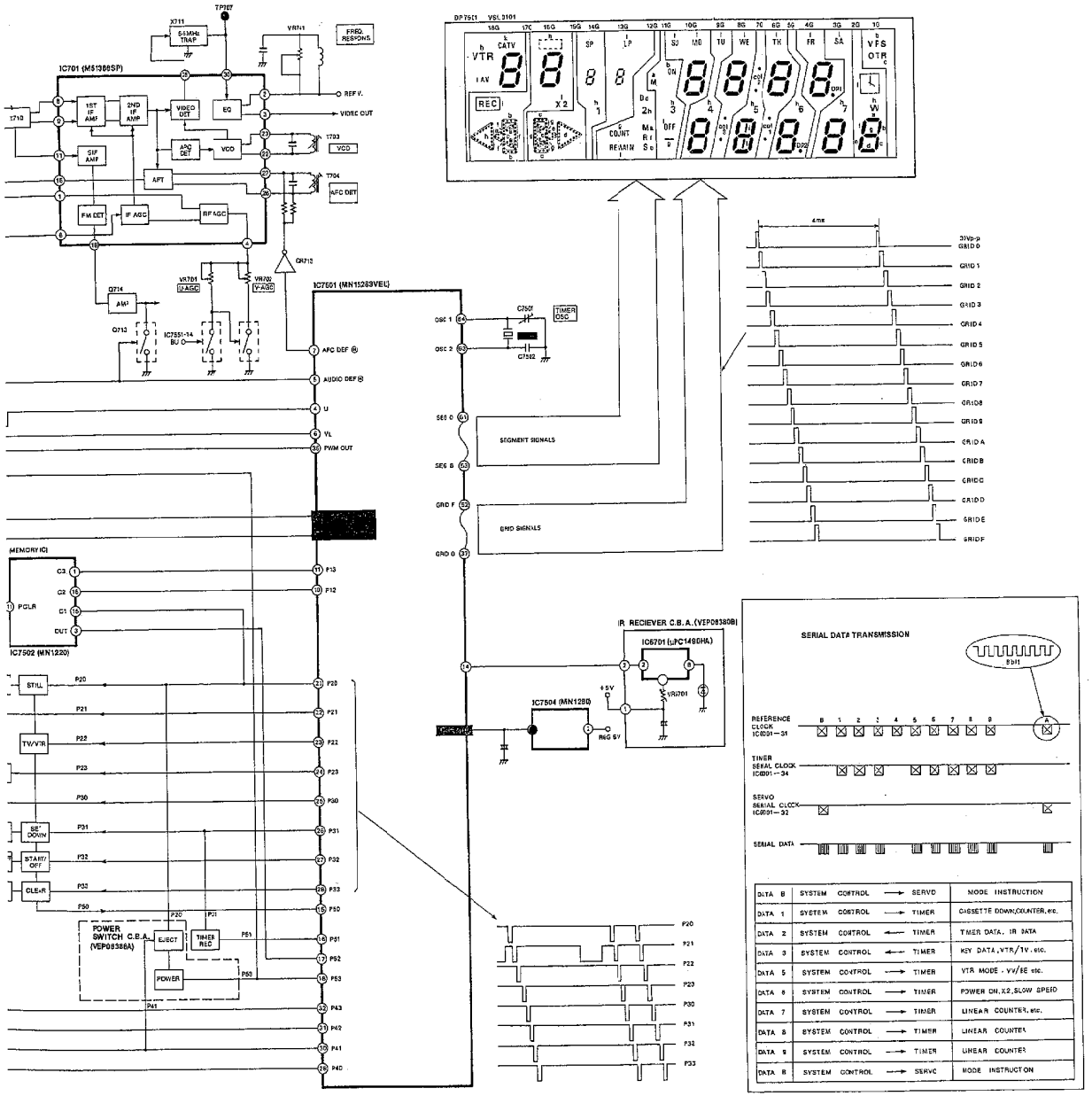
TP	ADJ.	MODE	INPUT
AUDIO OUT (TV DEMODU-LATOR C.B.A.-(15))	VR751		VIDEO COLOUR BAR V. MODU: 87.5%, 75dBμ AUDIO 400Hz A. MODU: 30% (60%, 100%) (15kHz DEV)
TAPE	**M. EQ.**	**SPEC.**	
	RC OSC/ OSCILLO-SCOPE or D.V.M/ M.V.M/ PATTERN GENERATOR		

1. Supply a video signal (COLOUR BAR pattern) from the pattern generator and 400Hz sine wave from RC oscillator to the input of the M.V.M.
2. Connect the output of the M.V.M to RF Input of the Deck.
3. Press the SEARCH (+) or (-) button so that the modulated RF signal on the channel 10 (NV-G20EN/EA) or 7 (NV-G20A) is able to receive.
4. Set the AFC ON condition.
5. Connect the oscilloscope OR D.V.M to TV Demodulator C.B.A-(15).
6. Adjust VR751 so that the audio level becomes as shown below.

DEV / M. EQ.	30%	60%	100%
OSCILLO-SCOPE	100±5mVp-p	200±5mVp-p	333±17mVp-p
D.V.M	35±2mVrms	70±4mVrms	117±6mVrms

SECTION 3
BLOCK DIAGRAMS & SCHEMATIC DIAGRAMS
3-1. SYSTEM CONTROL BLOCK DIAGRAM



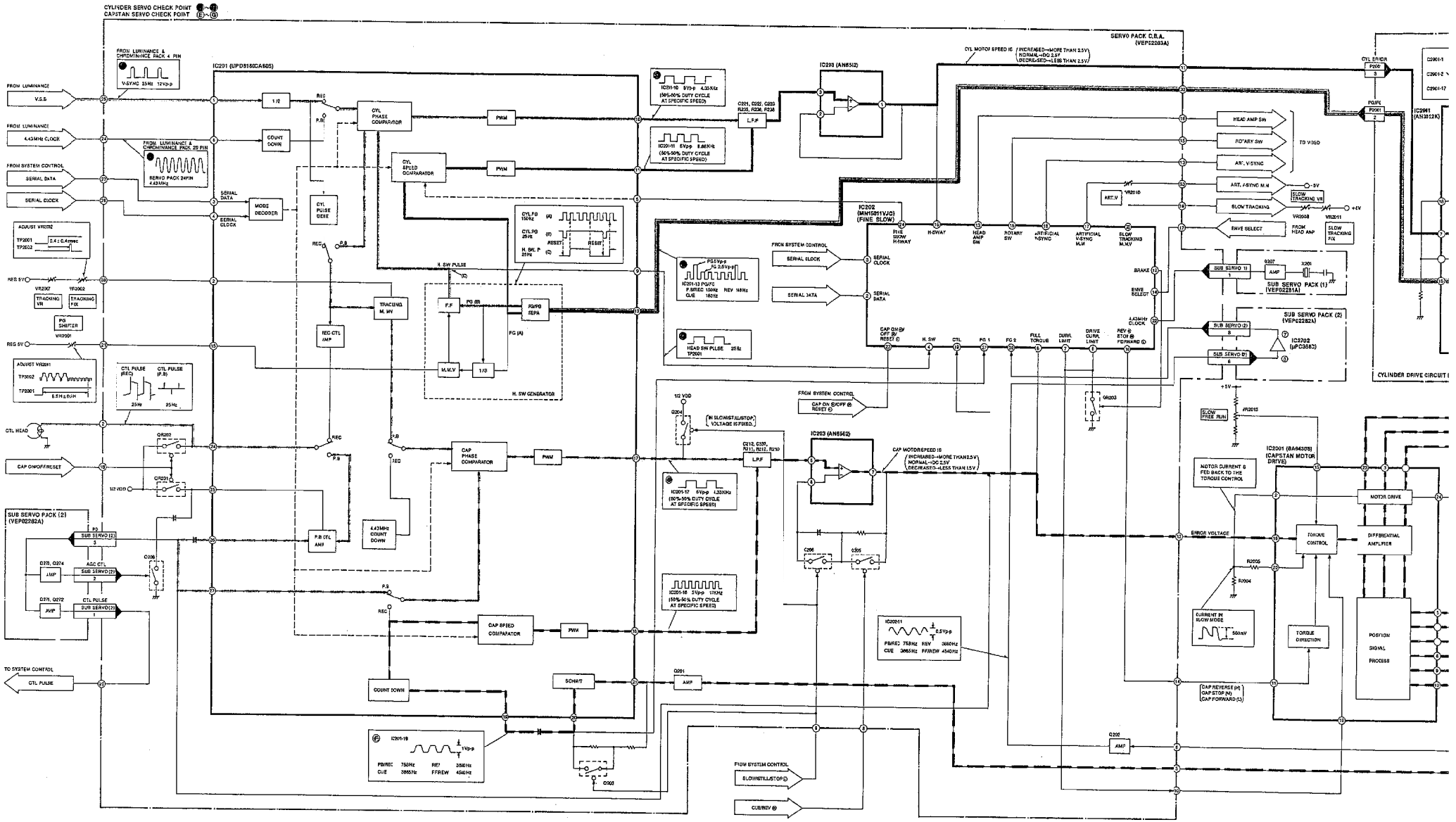


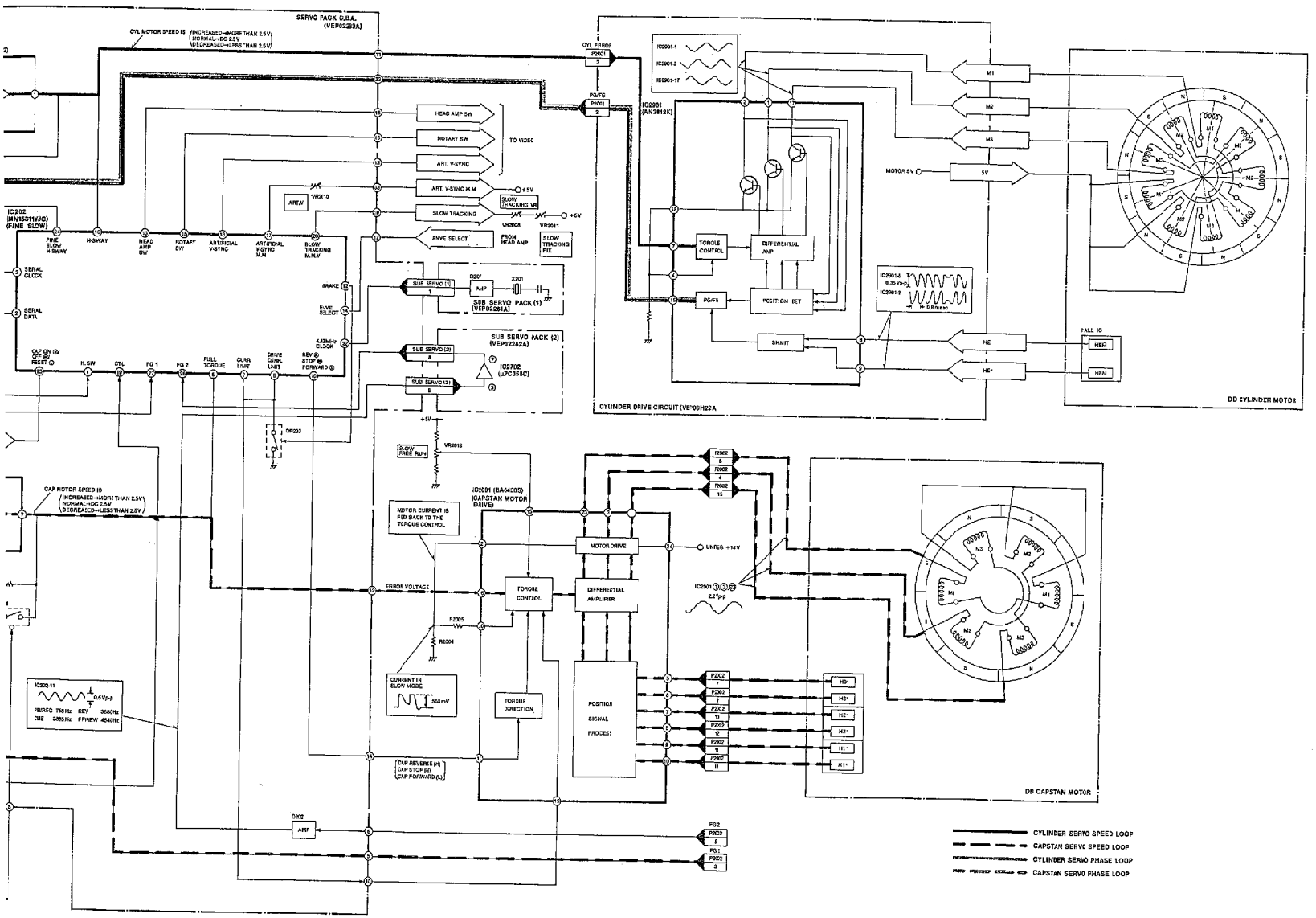
DATA				MODE INSTRUCTION
DATA 0	SYSTEM	CONTROL	→ SERVO	MODE INSTRUCTION
DATA 1	SYSTEM	CONTROL	→ TIMER	CASSETTE DOWN,COUNTER,etc.
DATA 2	SYSTEM	CONTROL	← TIMER	TIMER DATA, IR DATA
DATA 3	SYSTEM	CONTROL	← TIMER	KEY DATA,VTR/TV,etc.
DATA 5	SYSTEM	CONTROL	→ TIMER	VTR MODE - VV/SE etc.
DATA 6	SYSTEM	CONTROL	→ TIMER	POWER ON,X2,SLOW SPEED
DATA 7	SYSTEM	CONTROL	→ TIMER	LINEAR COUNTER,etc.
DATA 8	SYSTEM	CONTROL	→ TIMER	LINEAR COUNTER
DATA 9	SYSTEM	CONTROL	→ TIMER	LINEAR COUNTER
DATA A	SYSTEM	CONTROL	→ SERVO	MODE INSTRUCTION

SYMBOL	TRUTH VALUE TABLE
INVERTER	IN (a) H L / OUT (b) L H
COMPARTOR	IN (a)/(b) (a)>(b) (a)<(b) / OUT (c) H L
AND CIRCUIT	IN (a) L L H H / (b) L H L H / OUT (c) L L L H
OR CIRCUIT	IN (a) L L H H / (b) L H L H / OUT (c) L H H H
THREE STATES BUFFER	IN (a) H L H or L / (b) L L H / OUT (c) H L ※ ; ※ High Impedance
TR. SW (NPN TYPE)	BASE H L / TR. SW ON OFF
TR. SW (PNP TYPE)	BASE H L / TR. SW OFF ON
R-S TYPE FLIP-FLOP	IN (a) L L ⎍ / (b) L ⎍ L / OUT (c) ※ L H / (d) ◆ H L ; ※ Initial condition is maintained. ◆ Initial condition is reversed.

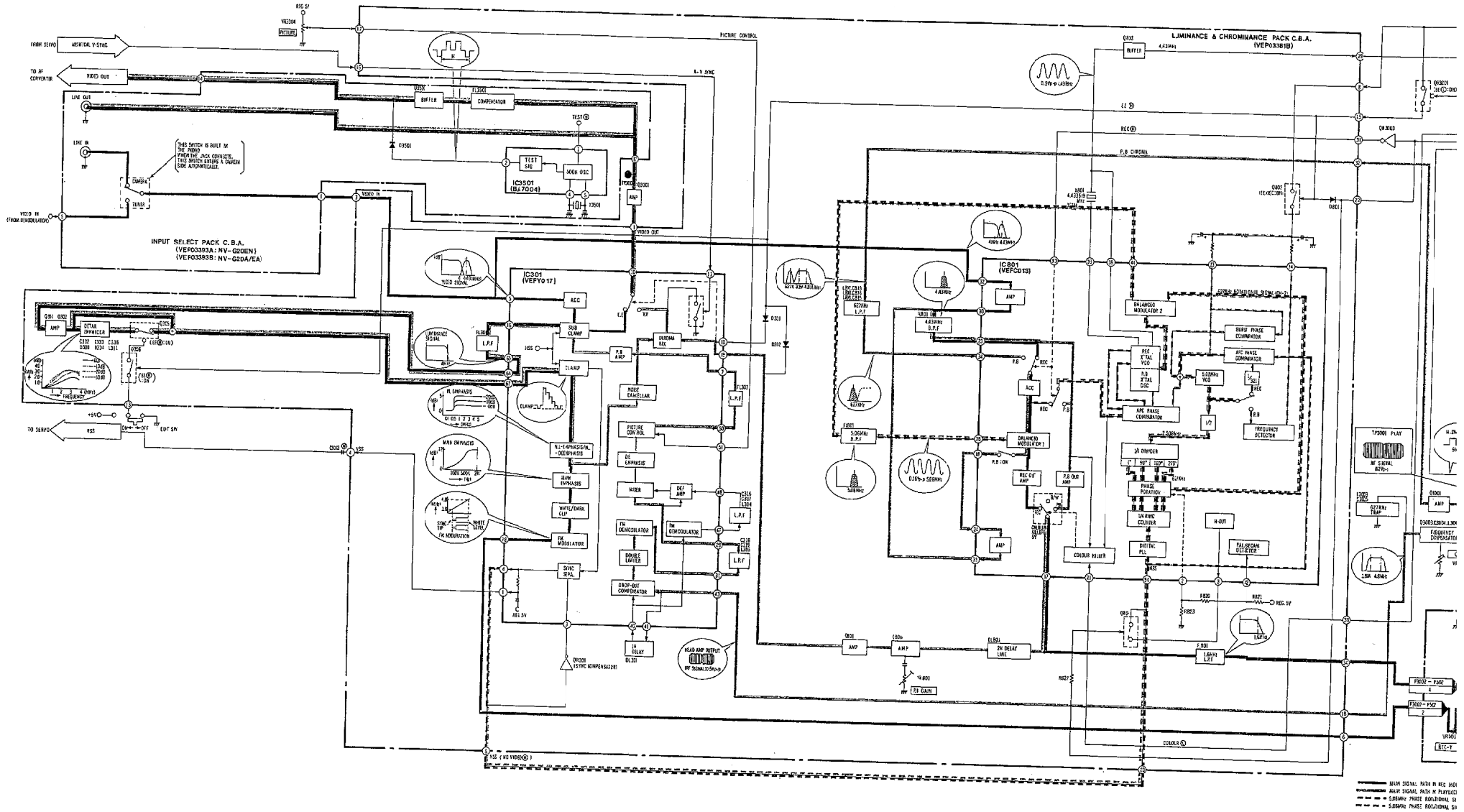
Next Page: SERVO Section

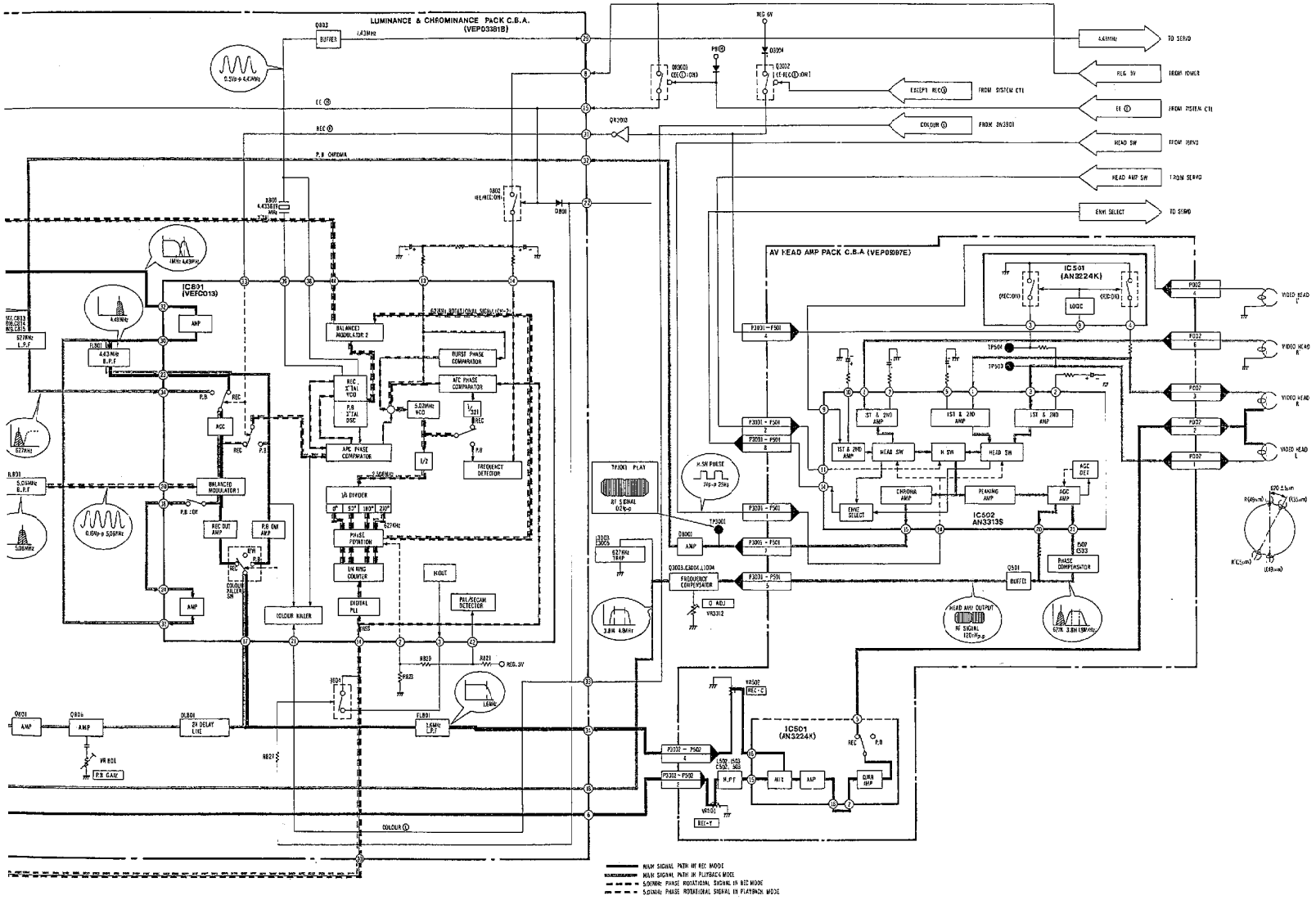
3-2 SERVO BLOCK DIAGRAM




SERVO PACK C.B.A.
(VEP02259A)
CYL MOTOR SPEED IS
(INCREASED—MORE THAN 2.5V
NORMAL—DC 2.5V
DECREASED—LESS THAN 2.5V)
CYL ERROR
PG/FG
IC2901
(AN3812K)
IC2901-1
IC2901-2
IC2901-17
HEAD AMP SW
ROTARY SW
ART. V-SYNC
ART. V-SYNC M.M
SLOW TRACKING
ENVE SELECT
TO MDSO
SLOW TRACKING VR
SLOW TRACKING FIX
FROM HEAD AMP
VR2010
VR2011
VR2009
ART.V
+5V
+6V
IC2202
(MN15311VJC)
(FINE SLOW)
FINE SLOW H-SWAY
H-SWAY
HEAD AMP SW
ROTARY SW
ARTIFICIAL V-SYNC
ARTIFICIAL V-SYNC M.M
SLOW TRACKING M.M.V
SERIAL CLOCK
SERIAL DATA
BRAKE
ENVE SELECT
SUB SERVO (1)
SUB SERVO PACK (1)
(VEP02291A)
Q201
AMP
X201
SUB SERVO PACK (2)
(VEP02282A)
SUB SERVO (2)
SUB SERVO (21)
IC2702
(μPC355C)
CAP ON (H)
OFF (H)
RESET (L)
H.SW
CTL
FG 1
FG 2
FULL TORQUE
CURR LIMIT
DRIVE CURR. LIMIT
REV (H)
STOP (M)
FORWARD (L)
4.43MHz
CLOCK
TORQUE CONTROL
DIFFERENTIAL AMP
POSITION DET
SMMIT
PG/FG
M1
M2
M3
5V
MOTOR 5V
HE
HE*
HALL IC
HBA
HBM
CYLINDER DRIVE CIRCUIT (VEP00H22A)
DD CYLINDER MOTOR
OR203
5.00V FREE RUN
VR2012
CAP MOTOR SPEED IS
(INCREASED—MORE THAN 2.5V
NORMAL—DC 2.5V
DECREASED—LESS THAN 2.5V)
IC2201 (BA6430S)
(CAPSTAN MOTOR DRIVE)
MOTOR CURRENT IS FED BACK TO THE TORQUE CONTROL
MOTOR DRIVE
UNREG +14V
ERROR VOLTAGE
TORQUE CONTROL
DIFFERENTIAL AMPLIFIER
R2005
R2004
CURRENT IN SLOW MODE
560mV
TORQUE DIRECTION
POSITION SIGNAL PROCESS
IC2201-11
0.6Vp-p
FR/REV 766Hz
REV 3650Hz
FF/REV 4540Hz
CAP REVERSE (H)
CAP STOP (H)
CAP FORWARD (L)
Q202
AMP
FG2
FG1
M3*
M3
M2*
M2
M1*
M1
DD CAPSTAN MOTOR
CYLINDER SERVO SPEED LOOP
CAPSTAN SERVO SPEED LOOP
CYLINDER SERVO PHASE LOOP
CAPSTAN SERVO PHASE LOOP

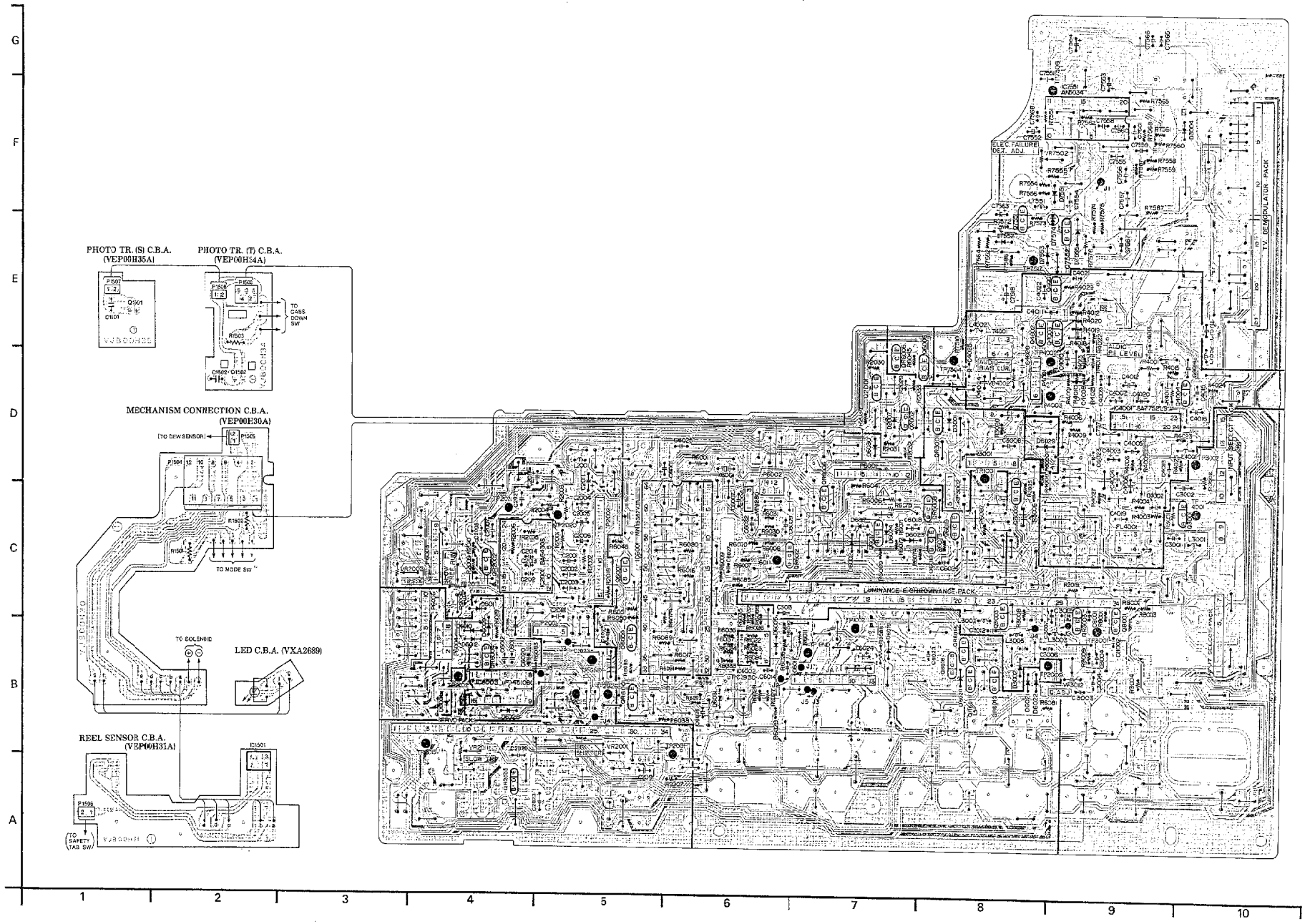
3-3 LUMINANCE & CHROMINANCE BLOCK DIAGRAM





Next Page:
MAIN C.B.A. Section

3-4. MAIN C.B.A. (VEP03395A: NV-G20EN) (VEP03395B: NV-G20A) (VEP03395C: NV-G20EA)



MAIN C B A ADDRESS INFORMATIONS

SERVO SECTION	
Transistor	
Q2001	D-7
Q2002	D-7
Transistor & Resistor	
QR2002	C-4
Integrated Circuit	
IC2001	C-4
Test Point	
TP2001	A-6
TP2002	B-4
TP2009	B-6
TP2015	B-4
TP2020	C-5
TP2021	C-4
TP2025	B-5
TP2026	B-5
Adjustment	
VR2001	B-5
VR2002	C-3
VR2011	B-4
VR2013	C-4
Connector	
P2001	B-5
P2002	C-5

ADDRESS INFORMATION

AUDIO SECTION	
Transistor	
Q4001	E-9
Q4002	E-8
Q4003	E-9
Q4004	D-10
Integrated Circuit	
IC4001	D-9
Test Point	
TP4001	C-10
TP4002	D-9
TP4003	D-9
Adjustment	
VR4001	D-9
VR4002	D-8
Connector	
P4001	E-8

ADDRESS INFORMATION

TUNER & TV DEMODURATOR SECTION	
Transistor	
Q7551	F-8
Q7552	E-9
Integrated Circuit	
IC7551	F-9
Test Point	
TP7504	D-8
TP7508	G-9
TP7517	E-8
Adjustment	
VR7502	F-9

ADDRESS INFORMATION

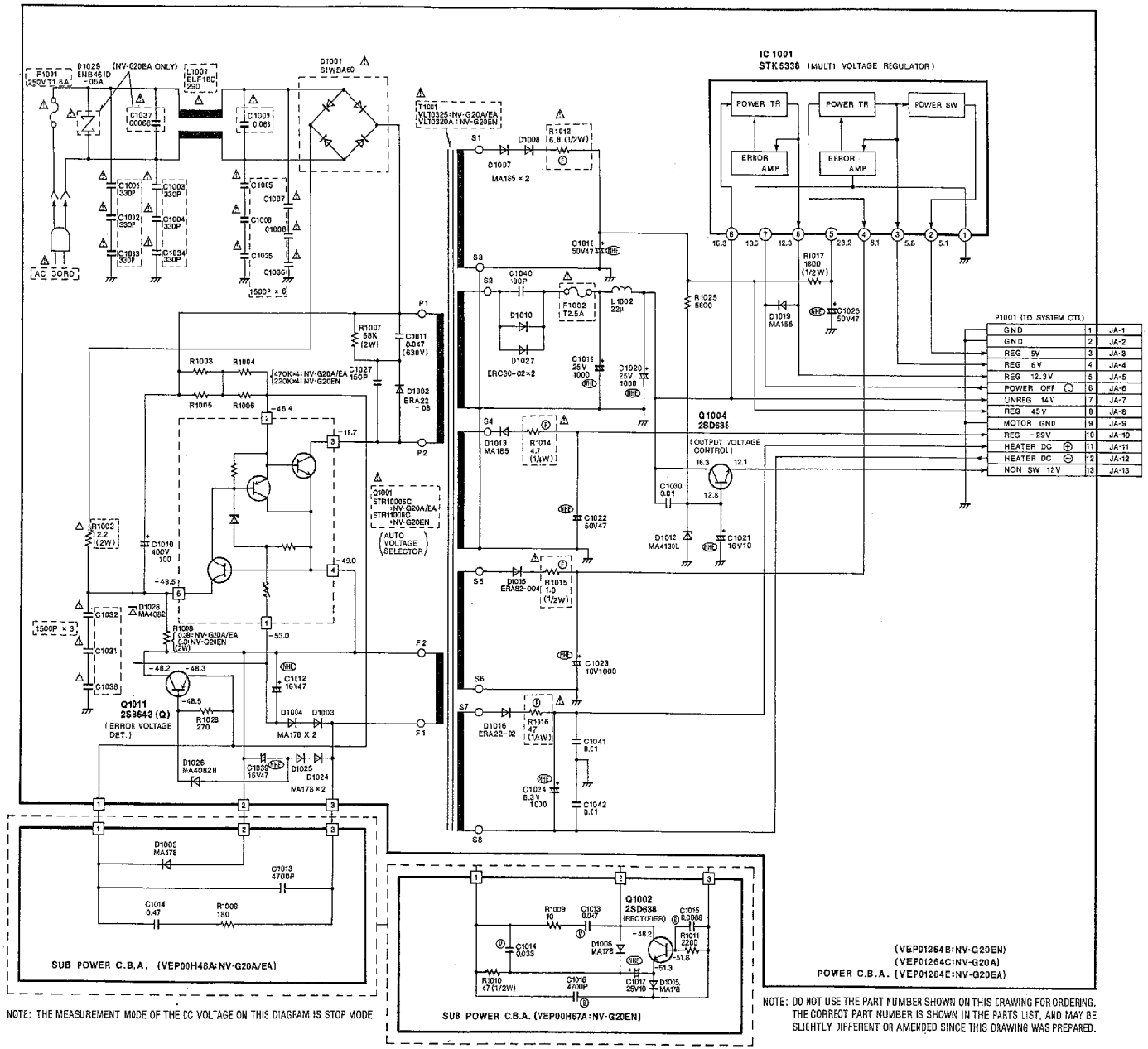
LUMINANCE & CHROMINANCE SECTION	
Transistor	
Q3001	C-10
Q3002	C-8
Q3003	C-8
Q8001	C-9
Transistor & Resistor	
QR3001	D-8
QR3003	C-9
Test Point	
TP3001	C-9
TP3002	D-10
Adjustment	
VR3012	B-9
Connector	
P3001	D-8
P3002	C-8

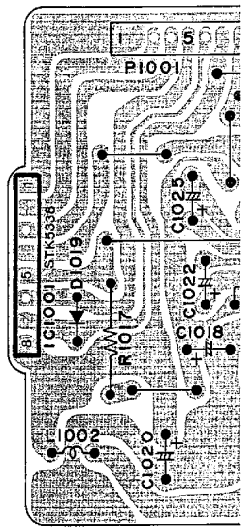
ADDRESS INFORMATION

SYSTEM CONTROL SECTION	
Transistor	
Q6006	D-8
Q6007	C-5
Q6009	B-5
Q6016	B-8
Q6017	C-7
Q6018	C-8
Q6019	C-8
Transistor & Resistor	
QR6001	B-5
QR6004	B-4
QR6005	D-7
QR6006	D-7
QR6008	C-8
QR6011	B-8
QR6012	C-6
QR6013	B-8
QR6014	B-8
Integrated Circuit	
IC6001	C-5
IC6002	B-6
IC6003	B-4
IC6004	C-6
Test Point	
TP1001	D-8
TP1002	C-7
TP6011	C-6
TP GND	B-5
TP GND	B-7
Connector	
P6001	D-7
P6002	D-6
P6003	C-4
P6004	B-4
P6005	B-4
JA	B-7

ADDRESS INFORMATION

3-5. POWER SCHEMATIC DIAGRAM

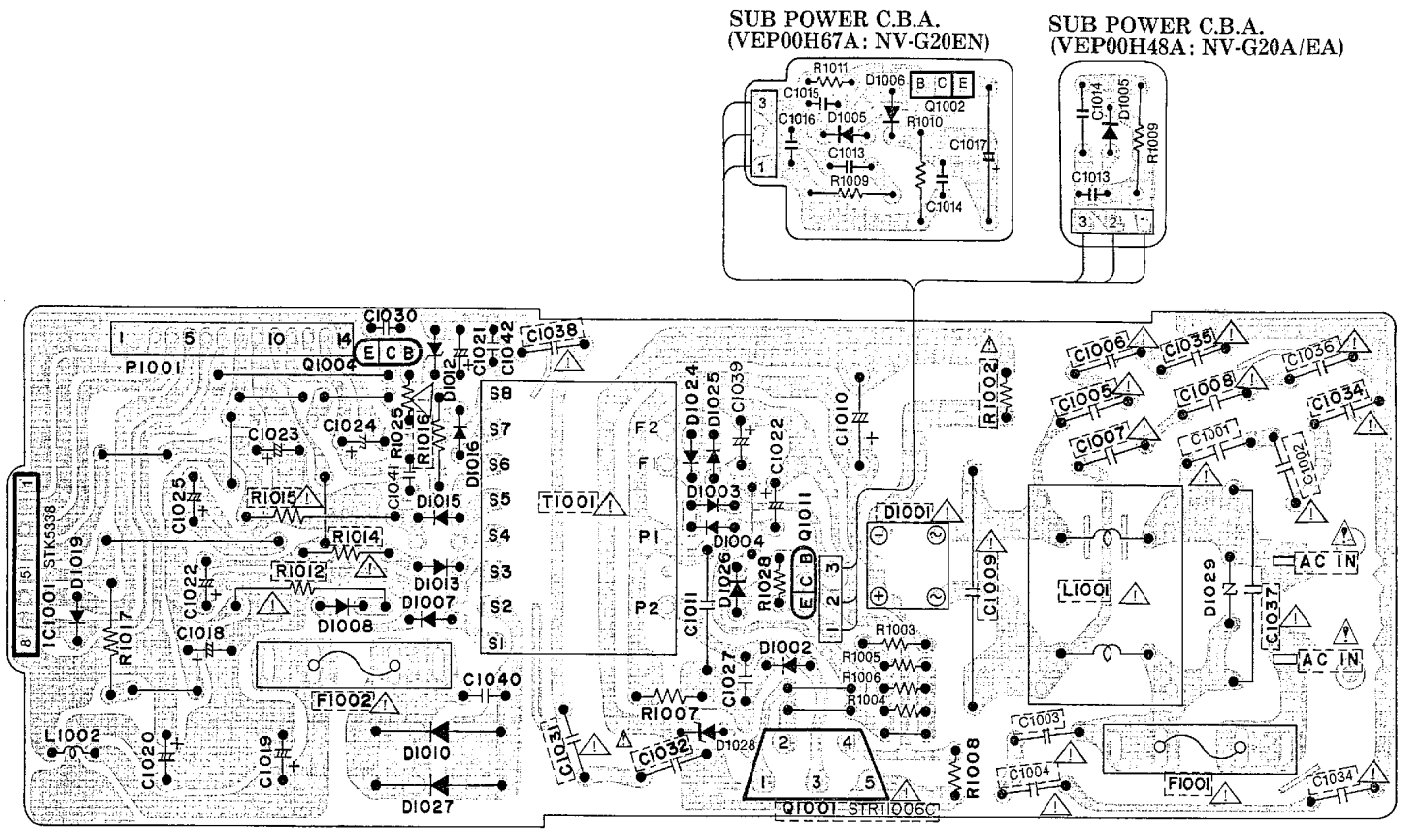




NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

3-6. POWER C.B.A. (VEP01264B: NV-G20EN) (VEP01264C: NV-G20A) (VEP01264E: NV-G20EA)



POWER IC VOLTAGE CHART

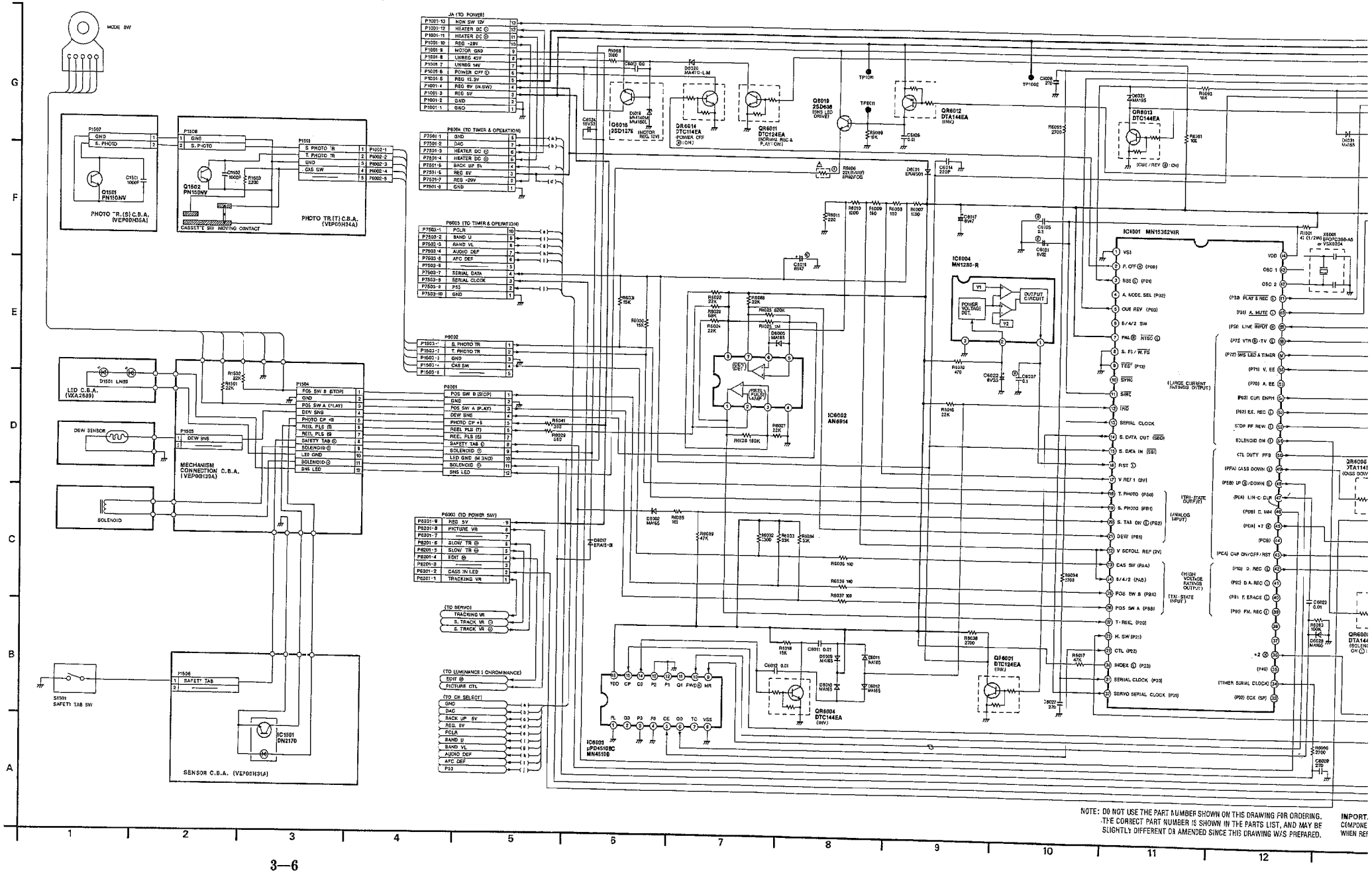
REF. NO.	IC1001																	
MODE	1	2	3	4	5	6	7	8										
STOP	0	5.1	5.8	8.1	23.2	12.3	13.6	16.3										

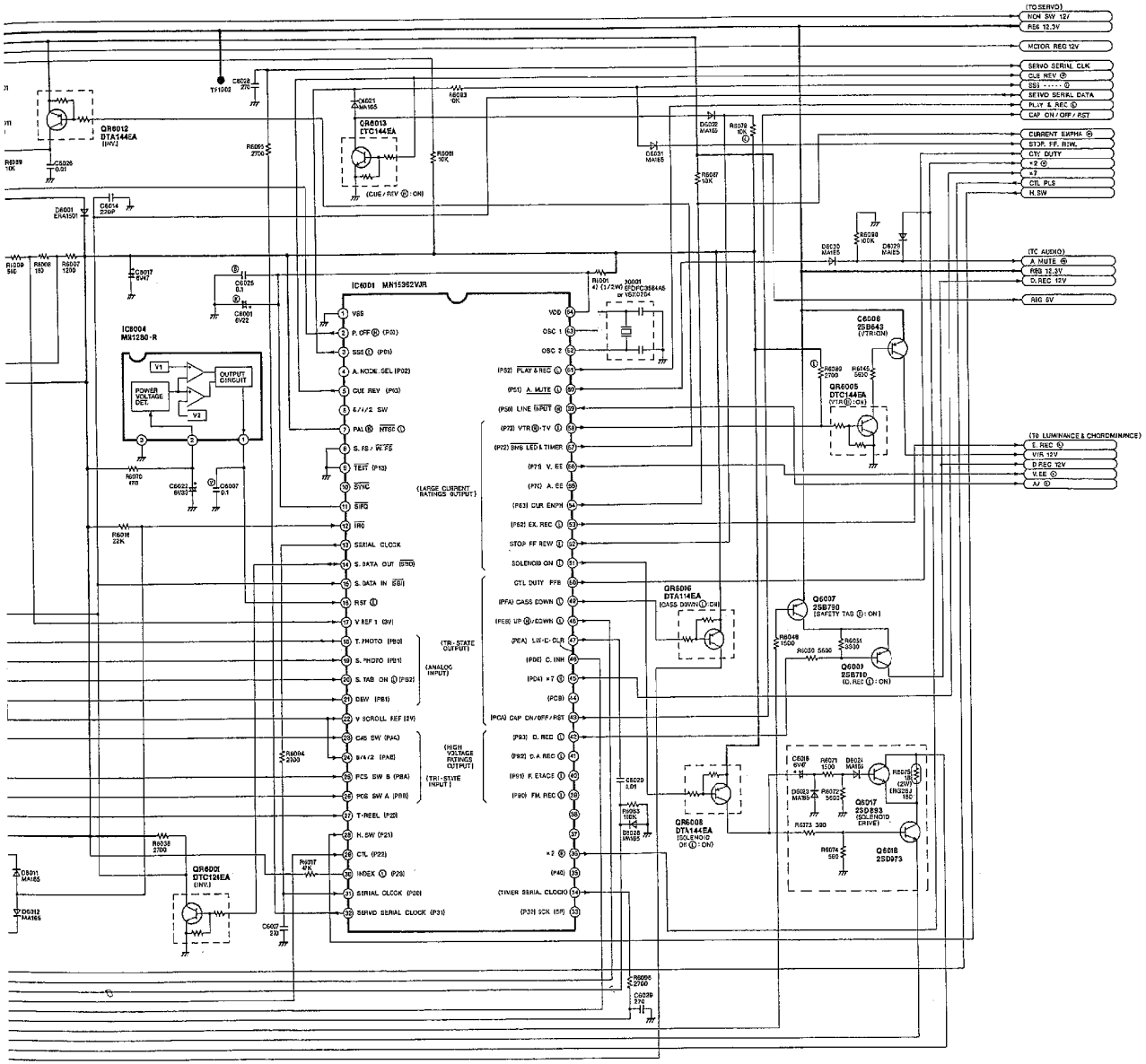
POWER TRs VOLTAGE CHART

REF. NO.	Q1001					Q1002			Q1004			Q1011					
MODE	1	2	3	4	5	E	C	B	E	C	B	E	C	B			
STOP	−53.0	−48.4	−19.7	−49.0	−48.5	−51.3	−48.2	−51.8	12.1	16.3	12.8	−48.3	−48.2	−48.5			

Next Page:
SYSTEM CONTROL Section

3-7. SYSTEM CONTROL SCHEMATIC DIAGRAM





SYSTEM CONTROL SCHEMATIC	
Transistor	
Q1501	F-1
Q1502	F-2
Q6006	F-14
Q6007	D-14
Q6009	C-14
Q6016	G-6
Q6017	C-14
Q6018	B-14
Q6019	G-8
Transistor & Resistor	
QR6001	B-11
QR6004	B-8
QR6005	E-14
QR6006	D-13
QR6008	B-13
QR6011	G-7
QR6012	G-9
QR6013	G-11
QR6014	G-7
Integrated Circuit	
IC1501	A-3
IC6001	F-10
IC6002	D-8
IC6003	A-6
IC6004	F-9
Test Point	
TP1001	G-8
TP1002	G-10
TP6011	G-8
Connector	
P1503	F-3
P1504	D-3
P1505	D-2
P1506	B-2
P1507	G-1
P1508	G-2
P6001	D-4
P6002	E-4
P6003	C-4
P6004	G-4
P6005	F-4
JA	G-4

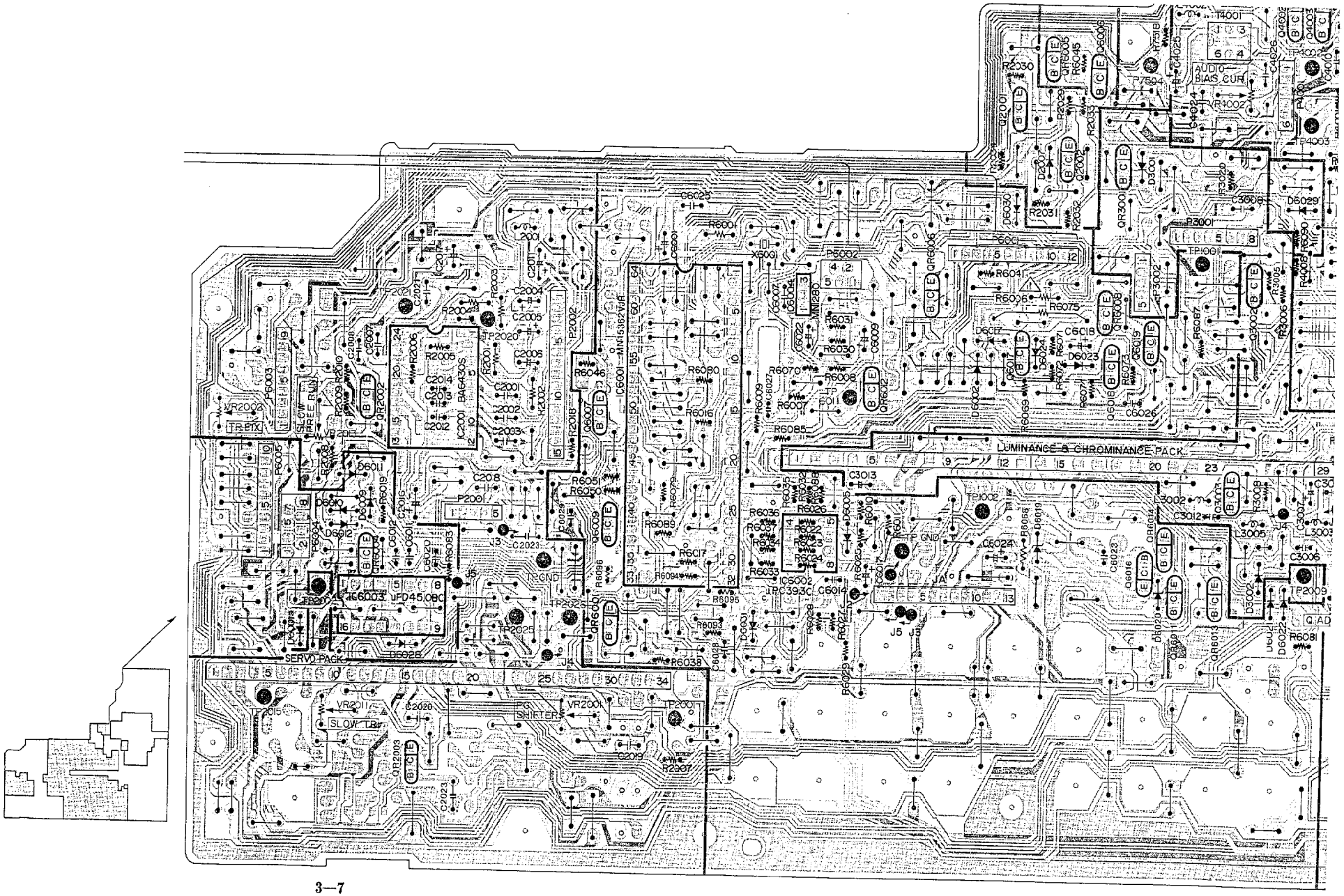
ADDRESS INFORMATION

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

9 10 11 12 13 14 15 16

3-8. SYSTEM CONTROL Section In Main C.B.A. (VEP03395A: NV-G20EN) (VEP03395B: NV-G20A) (VEP03395C: NV-G20EA)



SYSTEM CONTROL Section ICs VOLTAGE CHART

REF. NO.	IC6001																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	0	0	0	0	0	0.1	5.1	5.0	4.9	4.0	4.9	5.0	4.6	0.2	4.7	5.0	2.8	3.1	3.1	0.5
PLAY	0	0	4.9	0	0	0.2	5.0	5.0	4.9	4.0	4.9	5.0	4.6	0.3	4.7	5.0	2.9	3.1	3.1	0.5
REC	0	0	4.9	0	0	0.2	5.0	5.0	4.9	3.9	4.9	4.9	4.6	0.2	4.7	5.0	2.9	3.1	3.1	0.5
F.F	0	0	4.9	0	0	0.2	5.0	5.0	4.9	4.0	4.9	4.9	4.6	0.2	4.7	5.0	2.8	3.1	3.1	0.5
REW	0	0	4.9	0	0	0.2	5.0	5.0	4.9	4.0	4.9	4.9	4.6	0.3	4.8	5.0	2.8	3.1	3.1	0.5

REF. NO.	IC6001																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
STOP	0	2.0	5.0	2.0	2.0	5.0	0	0	0	5.0	4.5	4.8	4.7	4.7	0	0	4.9	4.9	0.2	0.2
PLAY	0	2.0	5.0	2.0	5.0	0	2.5	2.5	2.5	5.0	4.6	4.9	4.7	4.7	0	0	4.9	4.9	0.3	0.3
REC	0	2.0	5.1	2.0	5.0	0	0	2.3	2.5	5.0	4.6	4.8	4.7	4.7	0	0	4.9	4.9	0	0
F.F	0	2.0	5.0	2.0	2.0	5.0	2.5	0	2.5	5.0	4.6	4.8	4.8	4.7	0	0	4.9	4.9	0.3	0.3
REW	0	2.0	5.0	2.0	2.0	5.0	3.5	0	2.5	5.0	4.6	4.8	4.8	4.7	0	0	4.9	4.9	0.2	0.2

REF. NO.	IC6001																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
STOP	0.2	12.3	1.9	0	0	4.9	4.9	0	2.4	4.9	5.0	0	0.3	0	0.2	0	4.4	4.8	4.9	0
PLAY	0.3	12.3	4.9	0	0.1	0	4.9	4.9	2.4	4.9	5.0	4.4	0.3	4.8	0	5.1	4.4	4.8	4.9	0
REC	0	0.2	4.9	0	0.1	0	4.9	4.9	2.4	4.9	5.0	4.5	5.3	4.8	0.4	0	4.3	4.8	4.9	0
F.F	0.3	12.3	4.9	0	0.1	0	4.9	0	2.4	4.9	5.0	0	0.3	0	0.2	0	4.3	4.8	4.9	0
REW	0.2	12.3	4.9	0	0.1	0	4.9	0	2.4	4.9	5.0	0	0.3	0	0.2	0	4.5	4.8	4.9	0

REF. NO.	IC6001										IC6002									
MODE	61	62	63	64							1	2	3	4	5	6	7	8		
STOP	4.9	2.0	2.2	4.9							0	4.4	2.4	0	0	0.3	0	5.0		
PLAY	4.9	2.0	2.2	4.9							2.4	2.2	2.4	0	0	0.3	0	5.1		
REC	4.9	2.0	2.2	4.9							2.4	2.2	2.5	0	0	0.3	0	5.1		
F.F	4.9	2.0	2.2	4.9							3.0	2.4	2.5	0	0	0.3	0	5.1		
REW	4.9	2.0	2.2	4.9							2.3	2.4	2.5	0	0	0.3	0	5.0		

REF. NO.	IC6003																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
STOP	0	5.1	0	0	4.9	0	5.0	0	0	0	0	0	0	0	0.5	5.1				
PLAY	0	2.5	0	0	0	2.5	5.1	0	0	2.5	0	0	0	2.5	0.4	2.5				
REC	0	0	0	0	0	2.5	5.0	0	0	4.9	5.0	0	0	2.5	3.3	5.1				
F.F	0	1.2	0	0	0	2.5	4.5	0	0	4.9	2.1	0	0	2.5	1.1	5.1				
REW	0	0.9	0	0	0	2.5	4.5	0	0	0	2.1	0	0	2.2	1.2	5.1				

REF. NO.	IC6004																			
MODE	1	2	3																	
STOP	5.0	5.0	0																	
PLAY	5.0	5.0	0																	
REC	5.0	5.0	0																	
F.F	5.0	5.0	0																	
REW	5.0	5.0	0																	

SYSTEM CONTROL Section TRs VOLTAGE CHART

REF. NO.	Q6006			Q6007			Q6009			Q6016			Q6017			Q6018		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	12.3	12.2	11.5	12.3	12.3	11.5	12.3	0.1	12.3	0	16.2	14.4	13.2	13.2	4.8	0	13.2	0
PLAY	12.3	12.2	11.5	12.3	12.3	11.5	12.3	0.2	12.3	10.6	15.9	11.7	10.6	10.6	2.2	0	10.6	0
REC	12.2	12.1	11.5	12.2	12.2	11.5	12.2	12.1	11.4	10.5	15.8	11.7	10.5	10.5	2.2	0	10.5	0
F.F	12.3	12.2	11.5	12.3	12.3	11.5	12.3	0.1	12.3	10.5	16.0	11.7	10.5	10.5	2.1	0	10.5	0
REW	12.3	12.2	11.5	12.3	12.3	11.5	12.3	0.2	12.3	10.5	16.0	11.7	10.5	10.5	2.1	0	10.5	0

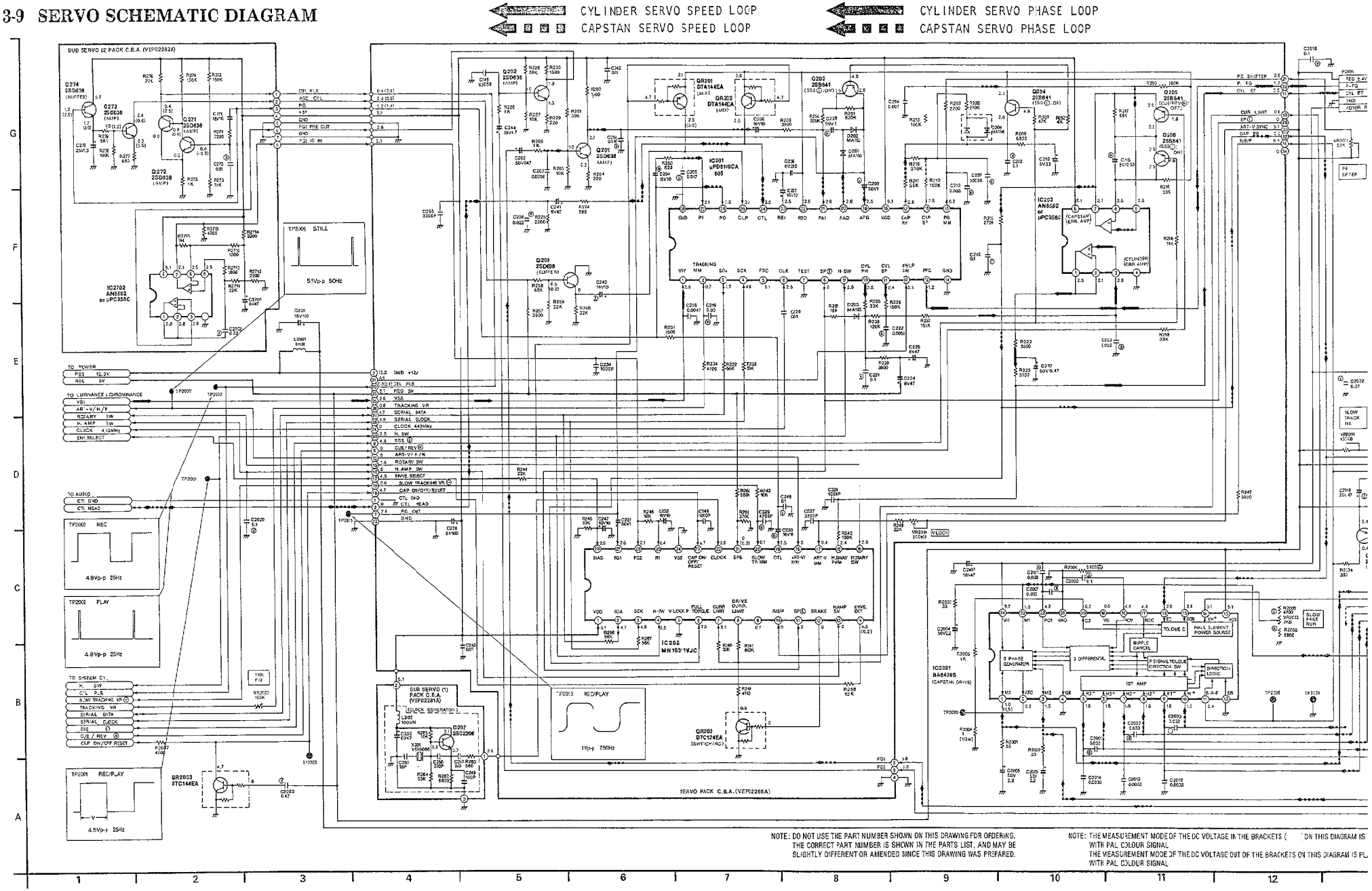
REF. NO.	Q6019		
MODE	E	C	B
STOP	0.6	13.2	0.6
PLAY	0.6	10.6	0.6
REC	0.6	10.5	0.6
F.F	0.6	10.5	0.6
REW	0.6	10.5	0.6

REF. NO.	QR6001			QR6004			QR6005			QR6006			QR6008			QR6011		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
STOP	0	4.7	0.2	0	0	5.0	0	0	4.8	5.0	2.5	2.5	5.0	0	5.0	0	3.4	0.6
PLAY	0	4.7	0.3	0	2.5	2.5	0	0	4.8	5.0	2.5	2.5	5.0	0	5.0	0	0.1	3.5
REC	0	4.8	0.3	0	2.5	2.5	0	0	4.8	5.0	2.5	2.5	5.1	0	0	0	0.1	3.5
F.F	0	4.7	0.3	0	3.1	2.0	0	0	4.8	5.0	2.5	2.4	5.0	0	5.0	0	0.1	3.5
REW	0	4.7	0.3	0	3.0	2.5	0	0	4.8	5.0	2.5	2.5	5.0	0	5.0	0	0.1	3.5

REF. NO.	QR6012			QR6013			QR6014											
MODE	E	C	B	E	C	B	E	C	B									
STOP	5.1	0.5	4.5	0	0.6	0	0	13.5	0									
PLAY	5.1	0.6	4.4	0	3.6	0	0	13.5	0									
REC	5.1	0.5	4.5	0	3.7	0	0	13.5	0									
F.F	5.1	0.5	4.4	0	0.7	0	0	13.5	0									
REW	5.1	0.5	4.3	0	0.7	0	0	13.5	0									

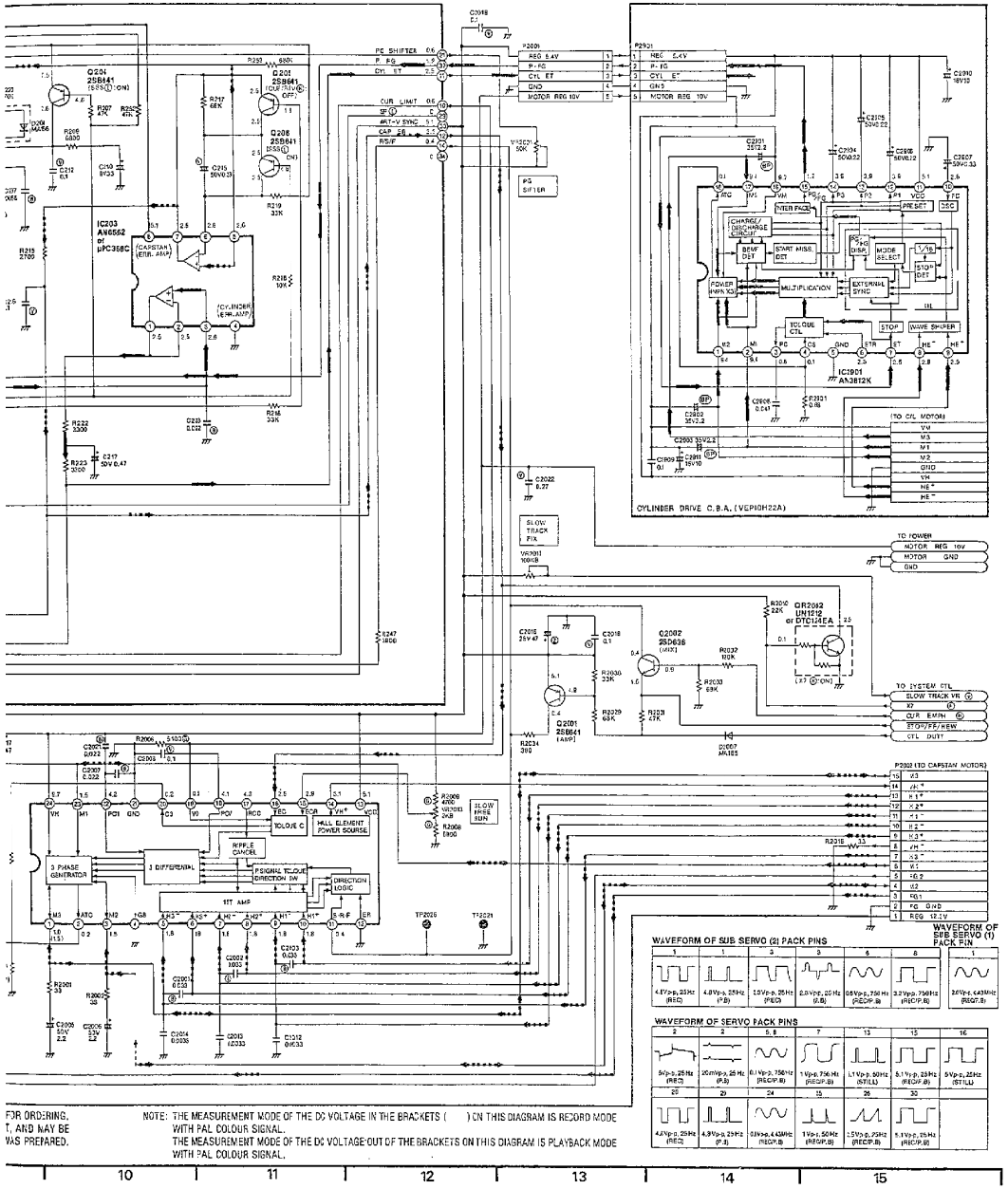
Next Page:
SERVO Section

3-9 SERVO SCHEMATIC DIAGRAM


CYLINDER SERVO SPEED LOOP
CAPSTAN SERVO SPEED LOOP
CYLINDER SERVO PHASE LOOP
CAPSTAN SERVO PHASE LOOP
SUB SERVO (2) PACK C.B.A. (VEP02282A)
SUB SERVO (1) PACK C.B.A. (VEP02281A)
SERVO PACK C.B.A. (VEP02266A)
IC2702 AN6552 or µPC358C
IC201 µPD5110CA
IC202 MN153*1VJC
IC203 AN6552 or µPC358C
IC2001 BA6439S (CAPSTAN DRIVE)
TP2005 STILL
5.1Vp-p 50Hz
TP2002 REC
4.8Vp-p 25Hz
TP2003 PLAY
4.8Vp-p 25Hz
TP2001 REC/PLAY
4.5Vp-p 25Hz
TP2015 REC/PLAY
1Vp-p 7.55Hz
TO POWER
TO LUMINANCE & CHROMINANCE
TO AUDIO
TO SYSTEM CT.
TRACKING
SERVO
CAPSTAN
CYLINDER
PG SHIFTER
3 PHASE GENERATOR
3 DIFFERENTIAL
1ST AMP
PULSE SLEWRT POWER SOURSE
RIPPLE CANCEL
SIGNAL TO LOCK DIRECTION SW
DIRECTION LOGIC
TO LOCK C
SLOW FREE RUN
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PL WITH PAL COLOUR SIGNAL

R SERVO PHASE LOOP

SERVO PHASE LOOP



FOR ORDERING.
T, AND MAY BE
WAS PREPARED.

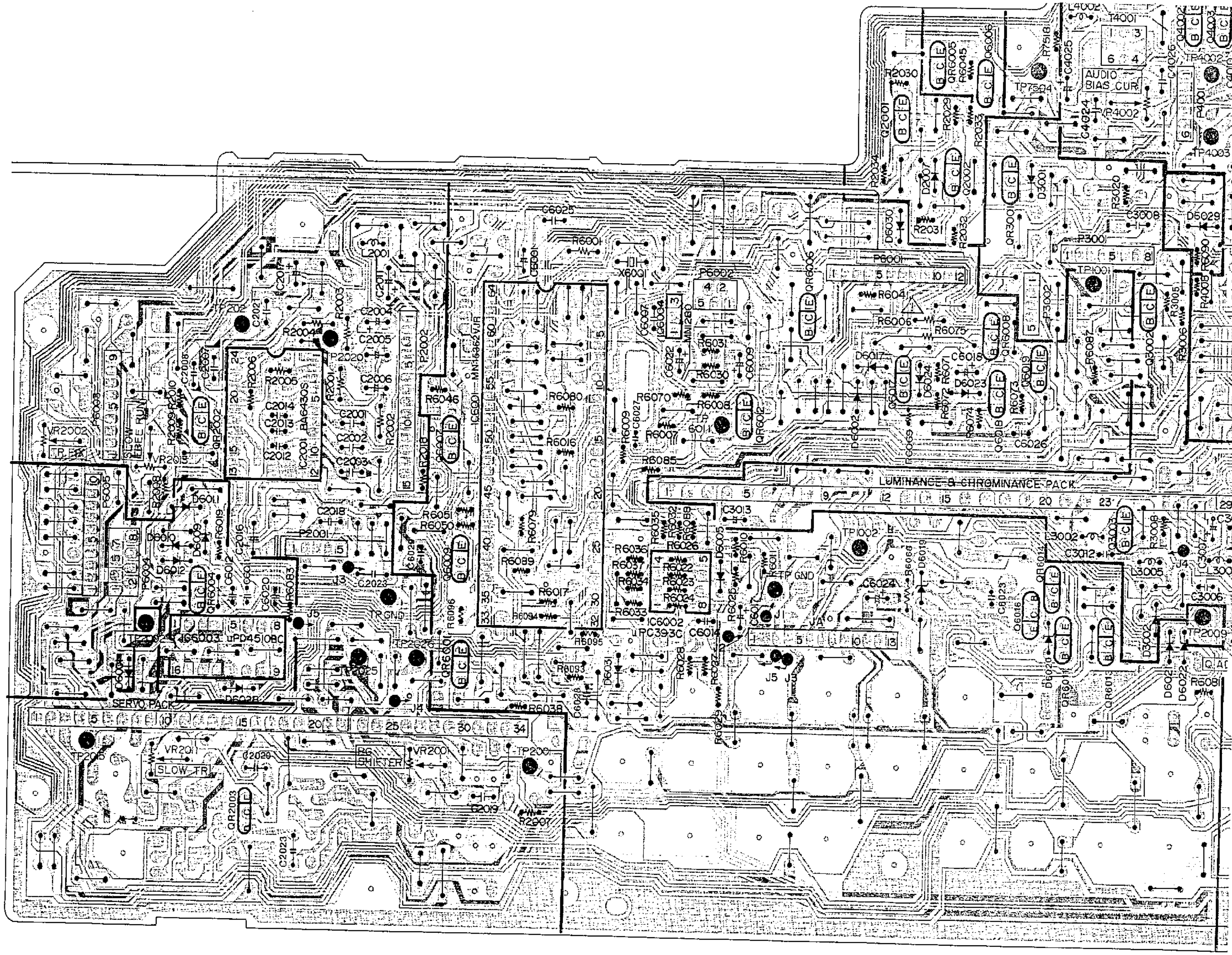
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.

10 11 12 13 14 15

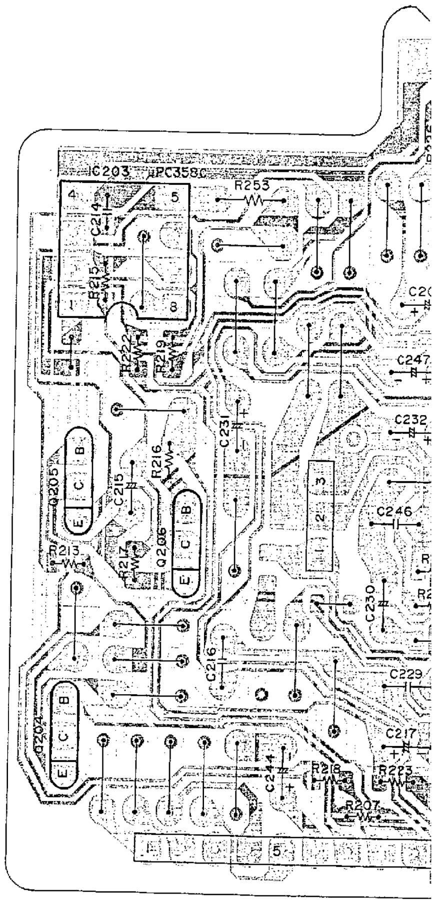
SERVO SCHEMATIC	
Transistor	
Q201	G-6
Q202	G-5
Q203	G-8
Q204	G-10
Q205	G-11
Q206	G-11
Q207	B-5
Q208	F-5
Q271	G-2
Q272	G-2
Q273	G-1
Q274	G-1
Q2001	D-13
Q2002	D-14
Transistor & Resistor	
QR201	G-7
QR202	G-7
QR203	B-7
QR2002	D-15
QR2003	A-2
Integrated Circuit	
IC201	B-7
IC202	B-7
IC203	F-10
IC2001	B-9
IC2702	F-1
IC2901	E-15
Test Point	
TP2301	D-2
TP2302	E-2
TP2309	E-2
TP2315	D-3
TP2320	B-9
TP2321	B-12
TP2325	B-9
TP2326	B-12
Adjustment	
VR2001	B-13
VR2002	B-3
VR2010	D-9
VR2011	D-13
VR2013	D-12
Connector	
P2901	B-13
P2902	D-15
P2901	B-13

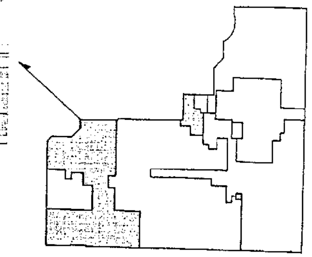
ADDRESS INFORMATION

3-10. SERVO Section In Main C.B.A. (VEP03395A: NV-G20EN) (VEP03395B: NV-G20A) (VEP03395C: NV-G20EA)



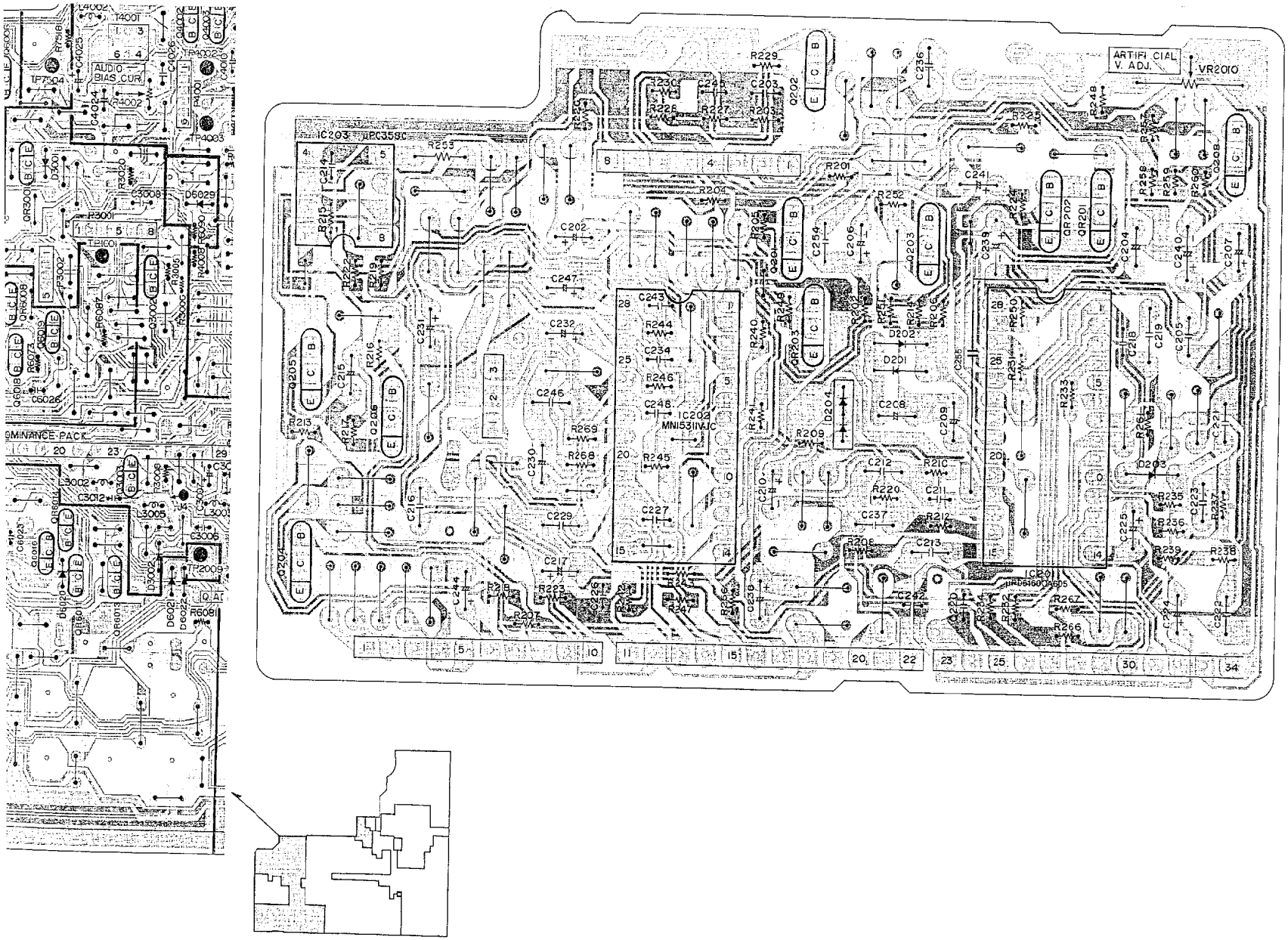
3-11 SERVO PACK C B A (VEP02



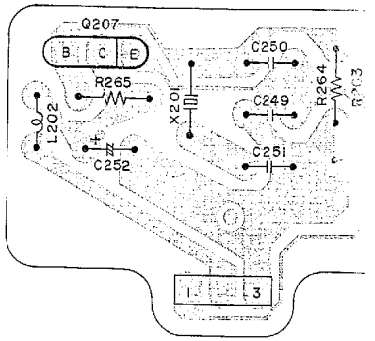


C: NV-G20EA)

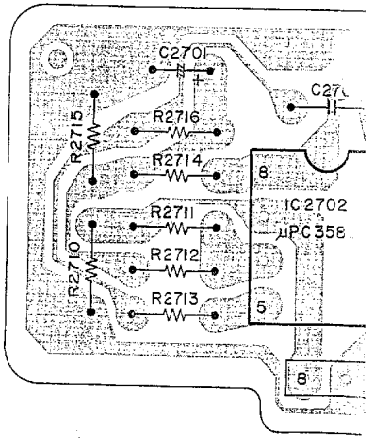
3-11 SERVO PACK C B A (VEP02266A)



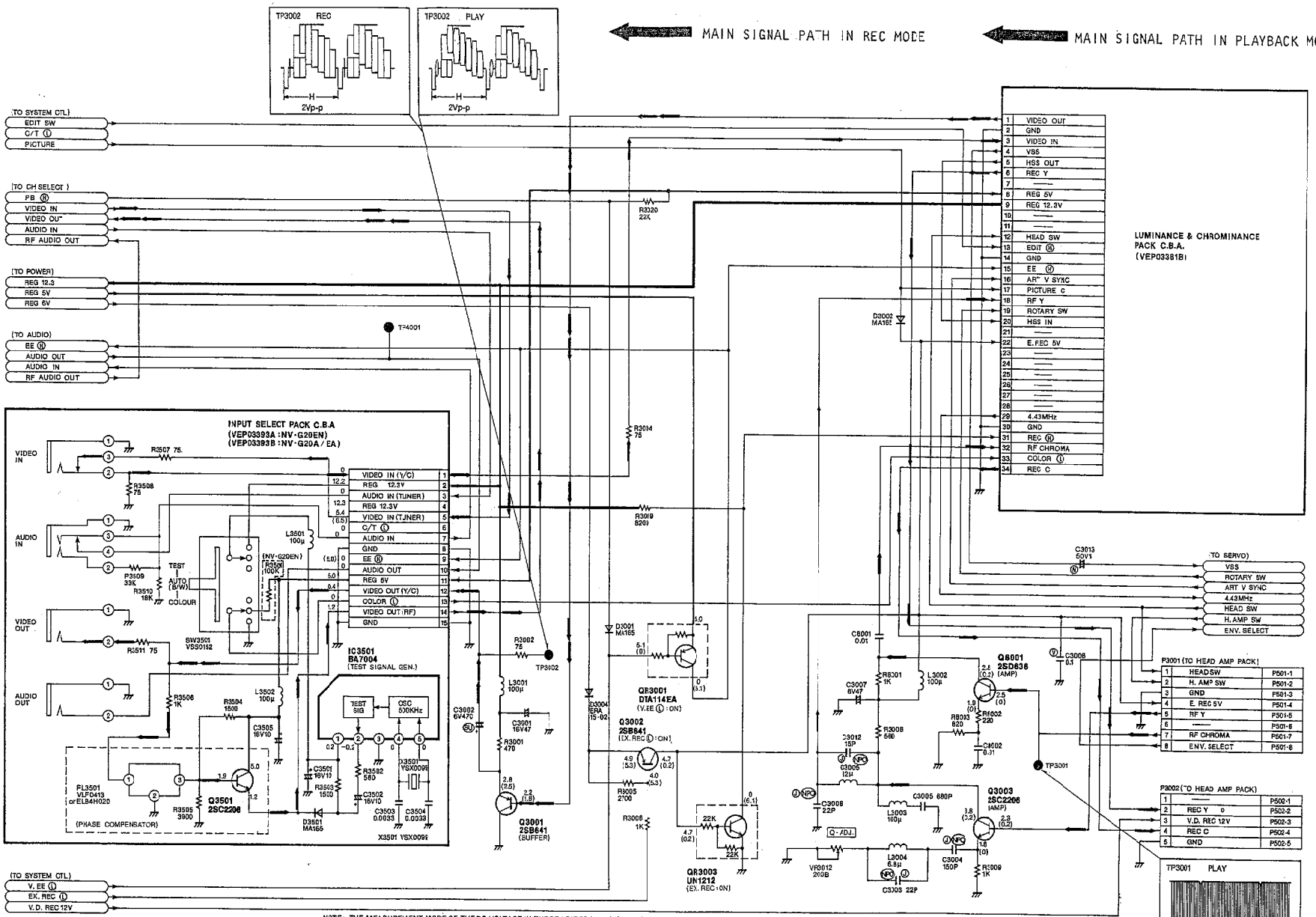
3-12. SUB SERVO (1) PACK (VEP02281A)



3-14 SUB SERVO (2) PACK C



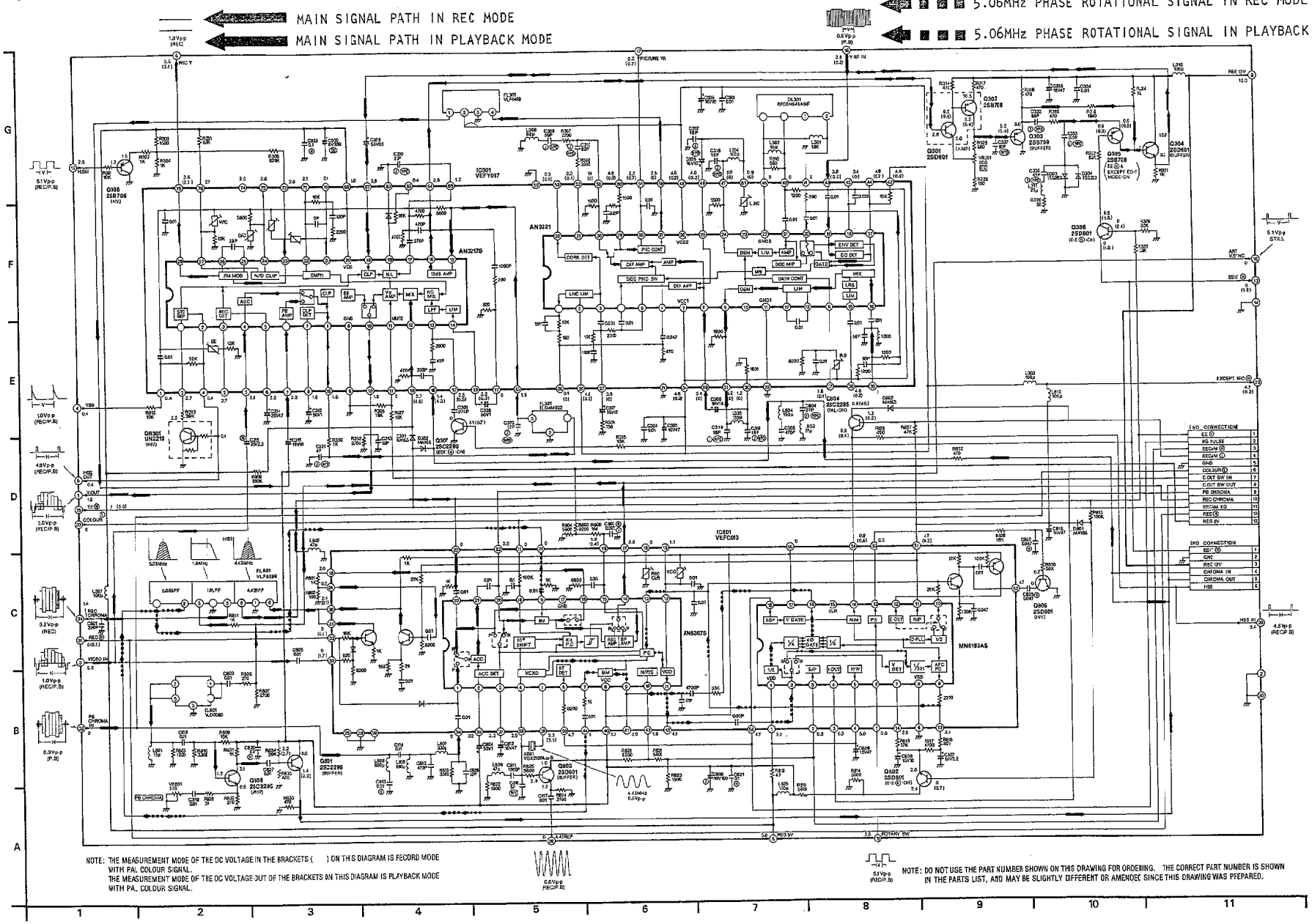
3-15 LUMINANCE & CHROMINANCE SCHEMATIC DIAGRAM



NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

3-16 LUMINANCE & CHROMINANCE PACK SCHEMATIC DIAGRAM


MAIN SIGNAL PATH IN REC MODE
MAIN SIGNAL PATH IN PLAYBACK MODE
5.06MHz PHASE ROTATIONAL SIGNAL IN REC MODE
5.06MHz PHASE ROTATIONAL SIGNAL IN PLAYBACK MOD
IC301 VEFY017
AN3215
AN3121
IC201 VEFC013
AN3367S
MN6183AS
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL.
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

)DE

LUMINANCE & CHROMINANCE PACK SCHEMATIC	
Transistor	
Q301	G-9
Q302	G-9
Q303	G-10
Q304	G-11
Q305	G-10
Q306	F-10
Q307	D-4
Q308	G-1
Q601	B-3
Q602	B-8
Q603	B-5
Q604	E-8
Q605	C-10
Q606	B-3
Transistor & Resistor	
QR301	E-2
Integrated Circuit	
IC301	G-5
IC801	D-7
Adjustment	
VR301	G-9
VR601	A-2

ADDRESS INFORMATION

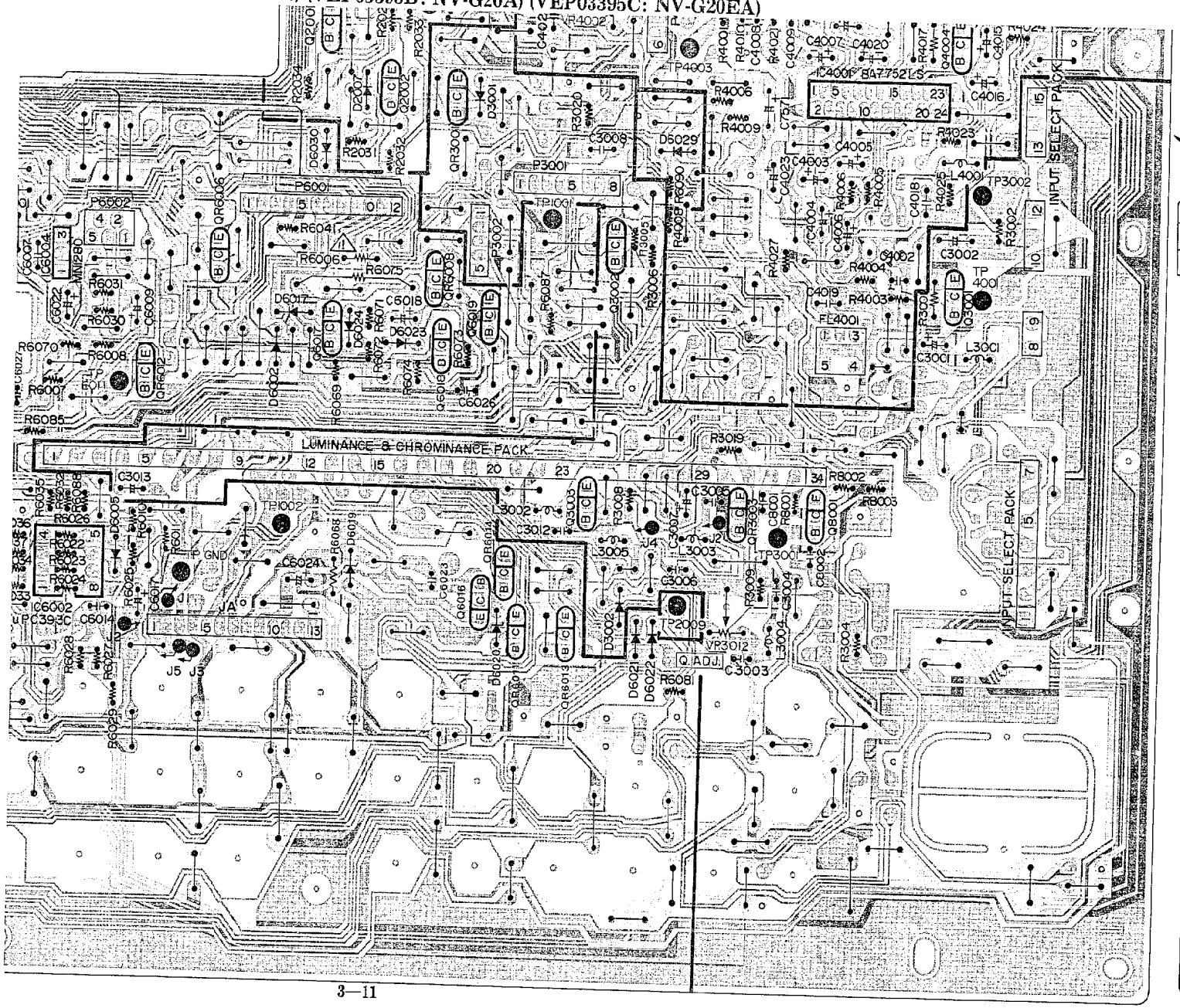
IC301 (VEFY017)

PIN NO.	WAVEFORM	PIN NO.	WAVEFORM
1	2.5Vp-p (REC/P.B)	40	0.1Vp-p (P.B)
3	0.8Vp-p (REC/P.B)	41	0.25Vp-p (P.B)
4	4.8Vp-p (REC/P.B)	43	0.7Vp-p (P.B)
5	1.0Vp-p (REC/P.B)	47	0.55Vp-p (P.B)
7	0.2Vp-p (P.B)	48	0.2Vp-p (P.B)
10	2.0Vp-p (REC/P.B)	50	0.25Vp-p (P.B)
11	3.0Vp-p (STILL)	61	0.2Vp-p (P.B)
16	0.6Vp-p (REC)	64	1.2Vp-p (REC/P.B)
16	0.5Vp-p (P.B)	65	0.3Vp-p (REC/P.B)
18, 19	0.4Vp-p (P.B)	66	0.6Vp-p (REC/P.B)
31	0.6Vp-p (P.B)	67	1.2Vp-p (REC/P.B)
39	0.2Vp-p (P.B)	71	0.3Vp-p (REC)
		78	0.1Vp-p (P.B)

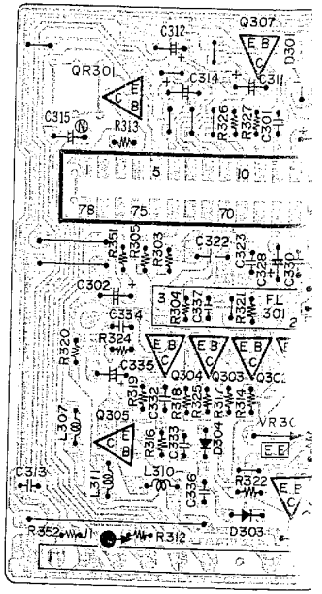
IC801 (VEFC013)

PIN NO.	WAVEFORM	PIN NO.	WAVEFORM
3	4.8Vp-p (REC/P.B)	32	1.0Vp-p (REC/P.B)
5	5.1Vp-p (REC/P.B)	34	0.3Vp-p (P.B)
17	1.2V p-p (REC) 1.0Vp-p (P.B)	38	0.55Vp-p (REC/P.B)
18	0.8Vp-p (REC) 1.5Vp-p (P.B)	39	0.7Vp-p (REC/P.B)
20	0.2Vp-p (REC/P.B)	44	0.35Vp-p (REC/P.B)
22	0.5Vp-p (REC/P.B)	50	4.6Vp-p (REC/P.B)
23	0.25Vp-p (REC) 0.6Vp-p (P.B)	53	5.8Vp-p (REC/P.B)
24	150mVp-p (P.B)	54	4.8Vp-p (REC)
30, 31	1.1Vp-p (REC)	54	4.5Vp-p (P.B)
30, 31	1.0Vp-p (P.B)	56	4.8Vp-p (REC/P.B)

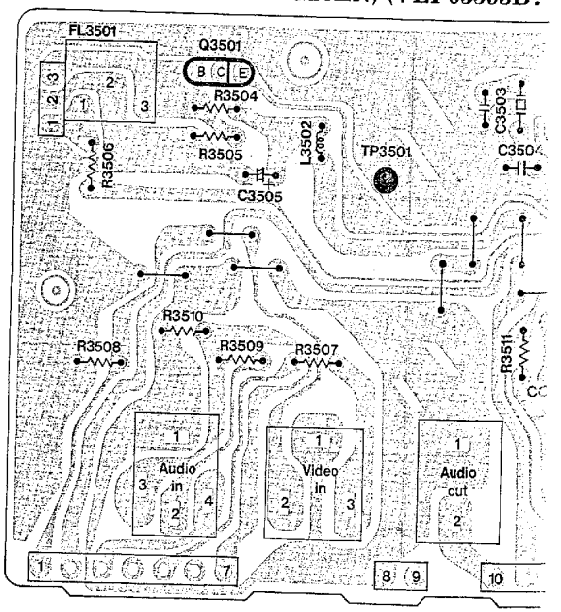
3-17. LUMINANCE & CHROMINANCE Section In Main C.B.A.
(VEP03395A: NV-G20EN) (VEP03395B: NV-G20A) (VEP03395C: NV-G20EA)



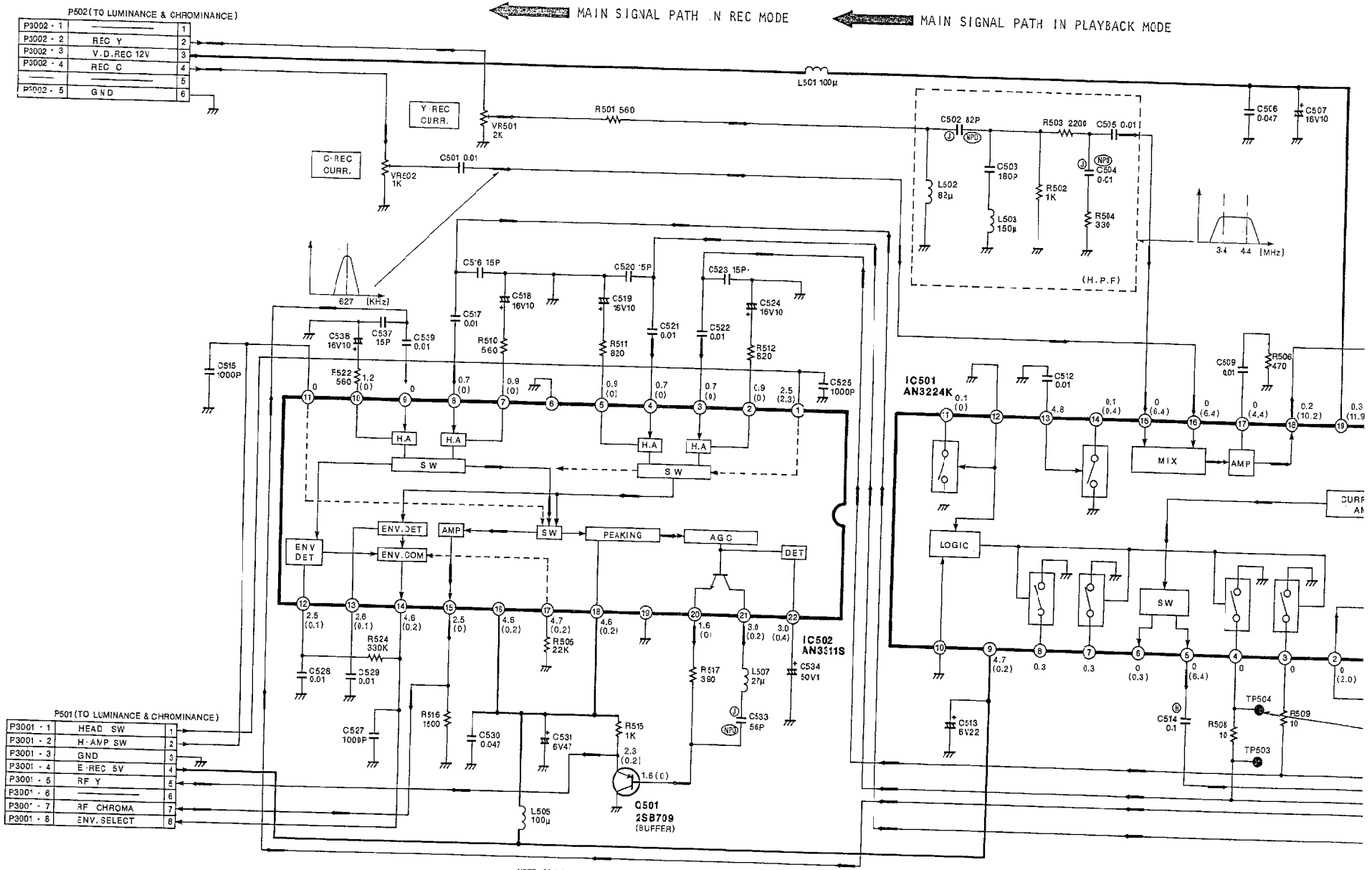
3-18 LUMINANCE & CI



3-19 INPUT SELECT PACK C B A
(VEP03393A: NV-G20EN) (VEP03393B:



3-20. HEAD AMP PACK SCHEMATIC DIAGRAM

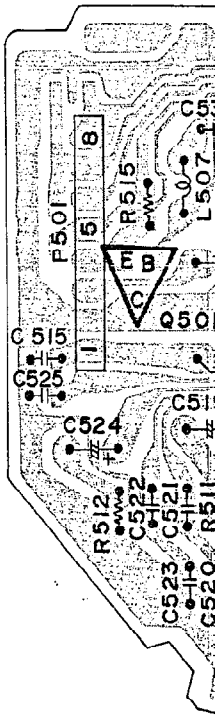


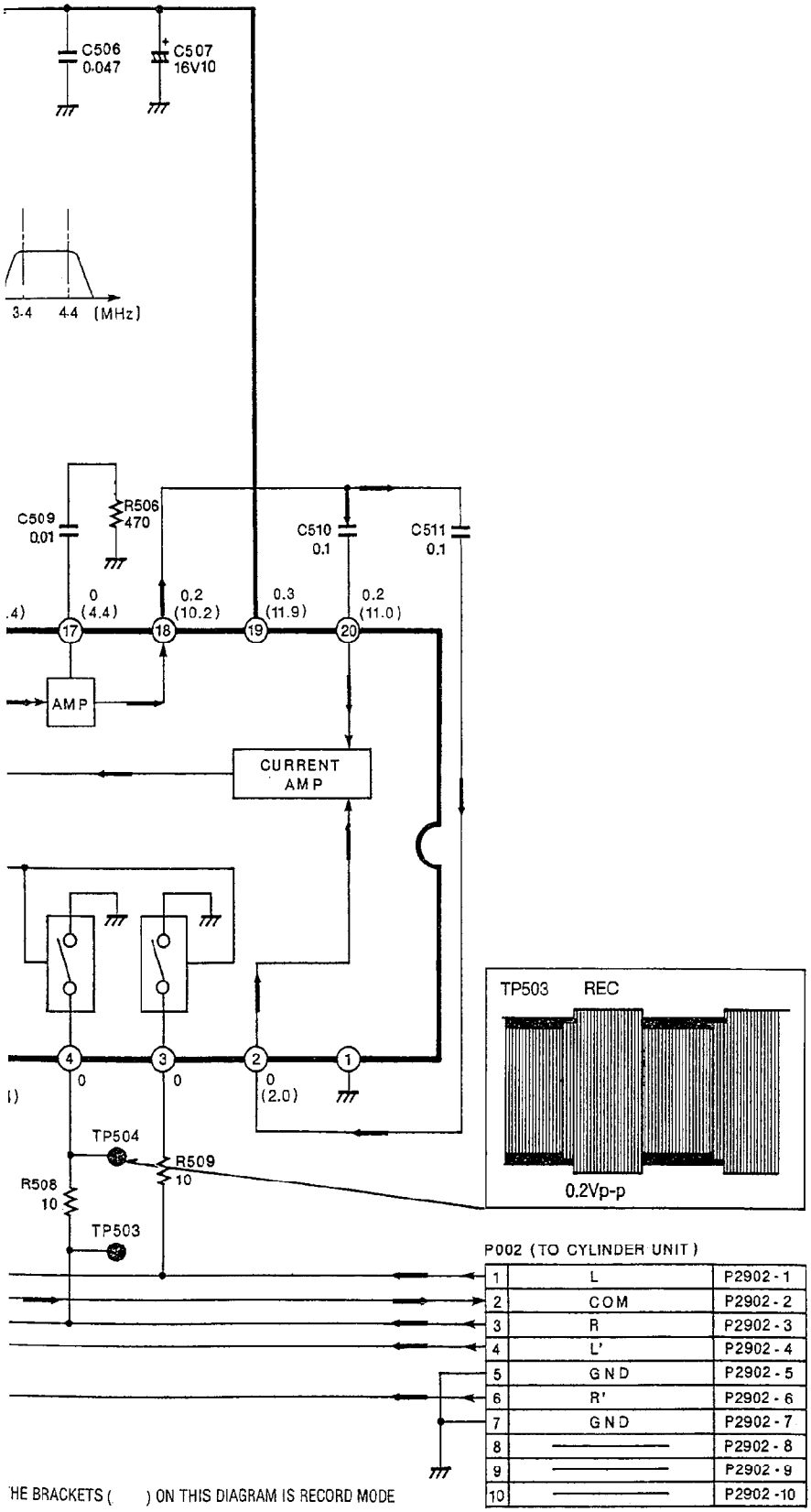
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS REC WITH PAL COLOUR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYE WITH PAL COLOUR SIGNAL.

Back Page:
LUMINANCE & CHROMINANCE Section

3-21. HEAD





1	L	P2902-1
2	COM	P2902-2
3	R	P2902-3
4	L'	P2902-4
5	GND	P2902-5
6	R'	P2902-6
7	GND	P2902-7
8	———	P2902-8
9	———	P2902-9
10	———	P2902-10

'HE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE

OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE

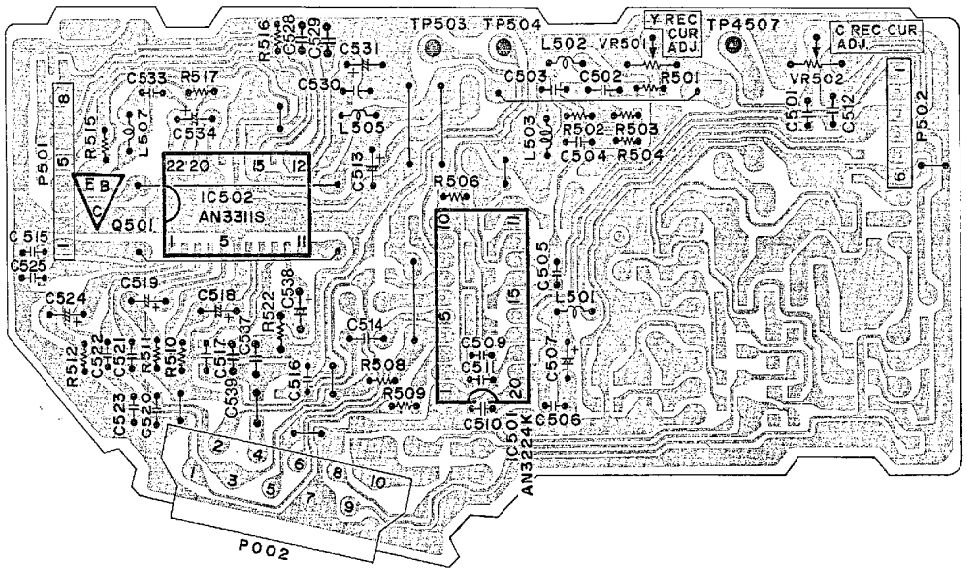
HEAD A

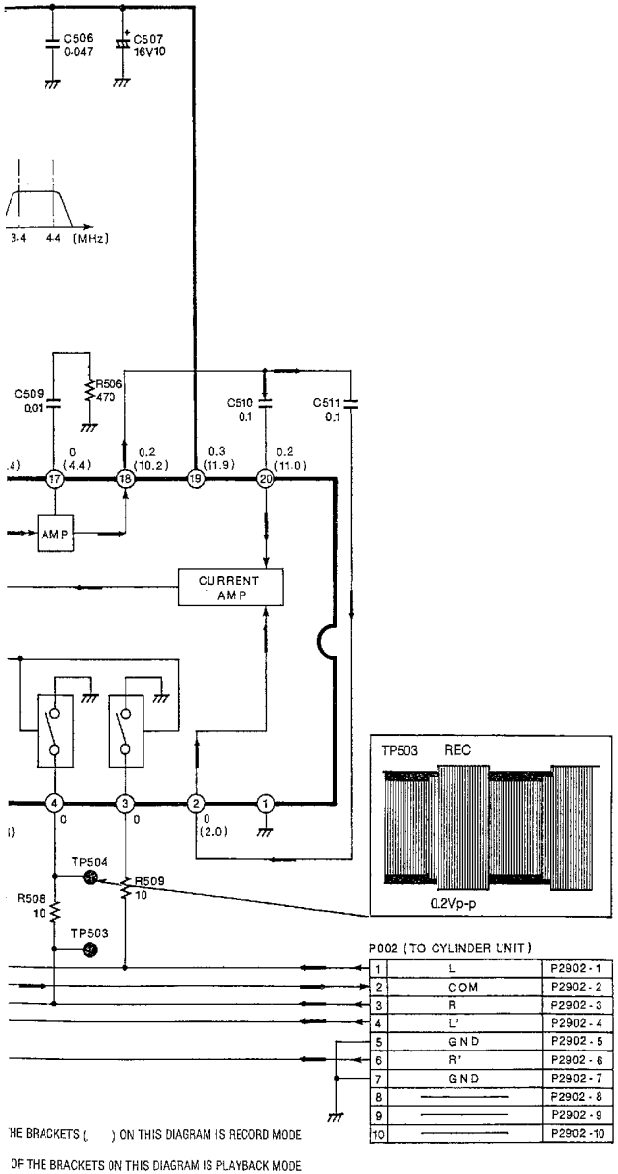
REF. NO.	
MODE	
PLAY	
REC	
REF. NO.	
MODE	
PLAY	2
REC	2
REF. NO.	
MODE	2
PLAY	3
REC	0

HEAD A

REF. NO.	
MODE	
PLAY	2
REC	0

3-21. HEAD AMP PACK C.B.A. (VEP05097E)





HEAD AMP PACK ICs VOLTAGE CHART

REF. NO.	IC501																		
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	0	0	0	0	0	0	0.3	0.3	4.7	0	0.1	0	4.6	0.1	0	0	0	0.2	0.3	0.2
REC	0	2.0	0	0	6.4	0.3	0.3	0.3	0.2	0	0	0	4.6	0.4	6.4	6.4	4.4	10.2	11.9	11.0

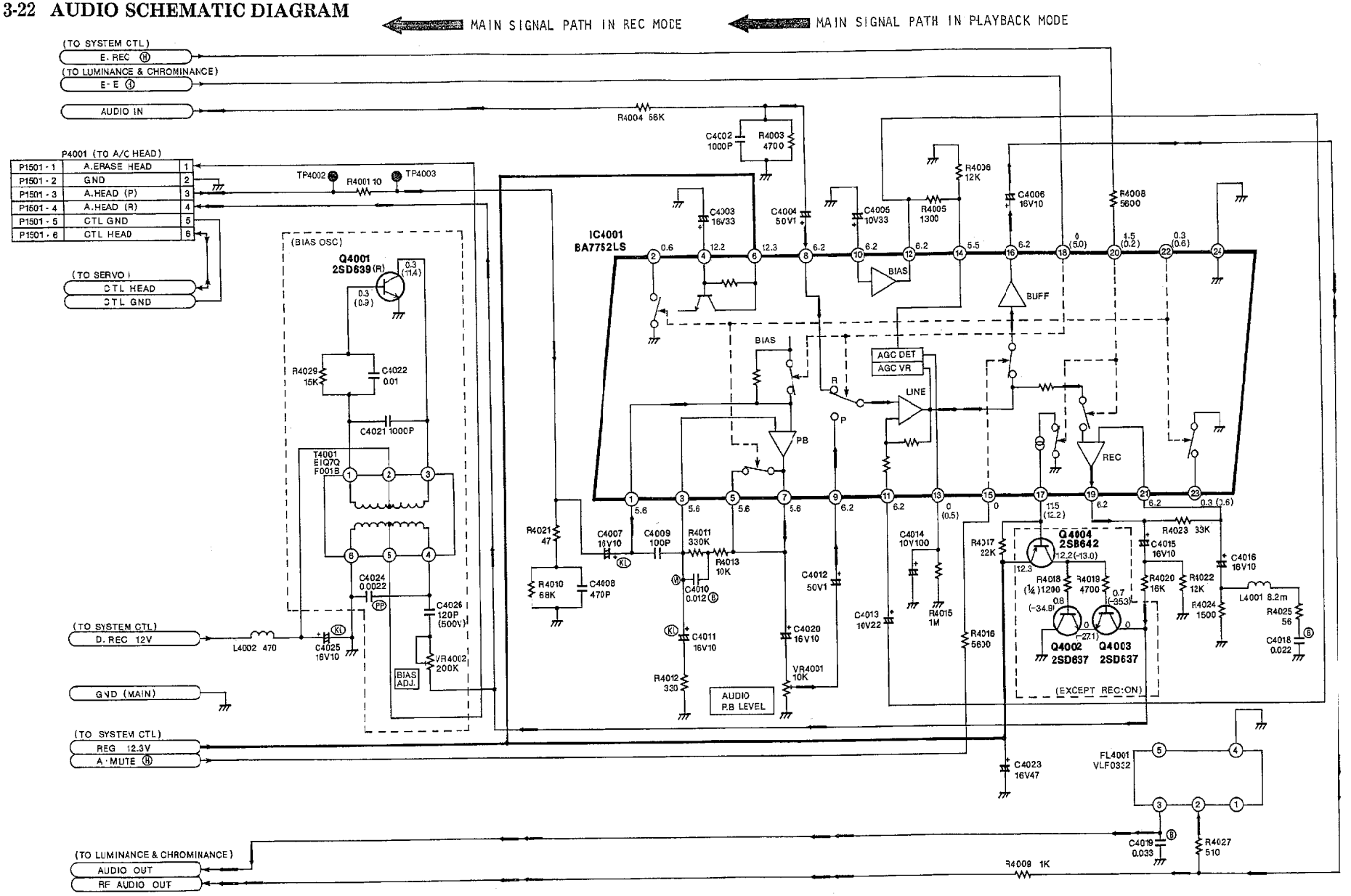
REF. NO.	IC502																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	2.5	0.9	0.7	0.7	0.9	0	0.9	0.7	0	1.2	0	2.5	2.6	4.6	2.5	4.6	4.7	4.6	0	1.6
REC	2.3	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.2	0	0.2	0.2	0.2	0	0

REF. NO.	IC502																			
MODE	21	22																		
PLAY	3.0	3.0																		
REC	0.2	0.4																		

HEAD AMP PACK TR VOLTAGE CHART

REF. NO.	Q501																			
MODE	E	C	B																	
PLAY	2.3	0	1.6																	
REC	0.2	0	0																	

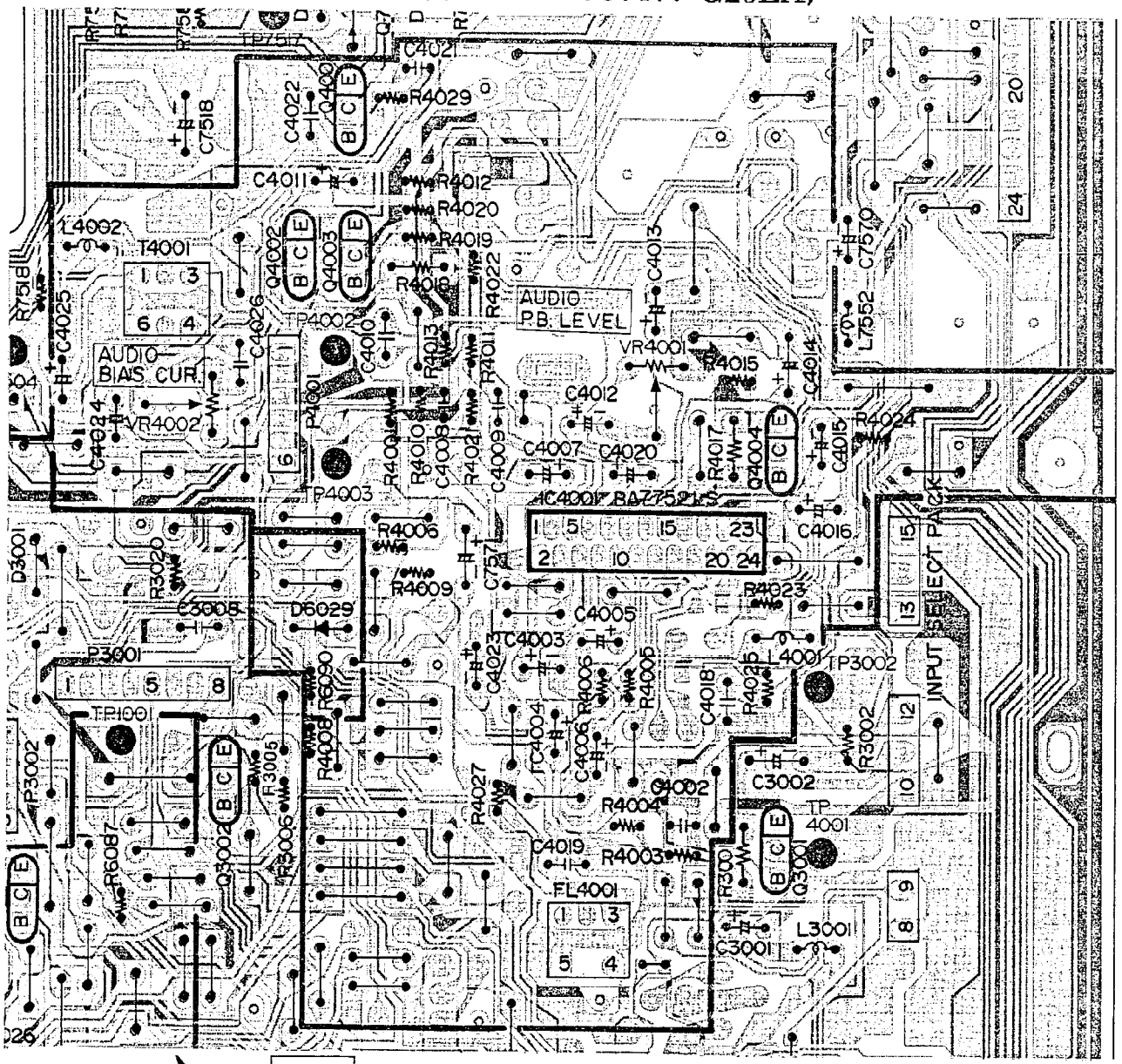
3-22 AUDIO SCHEMATIC DIAGRAM

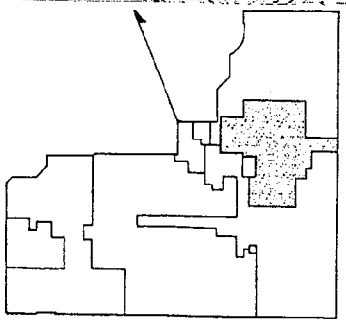


NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH 1kHz, 0dB SINE WAVE SIGNA..
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH 1kHz, 0dB SINE WAVE SIGNAL.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

3-23. AUDIO Section In Main C.B.A. (VEP03395A: NV-G20EN) (VEP03395B: NV-G20A) (VEP03395C: NV-G20EA)





AUDIO Section TRs VOLTAGE CHART

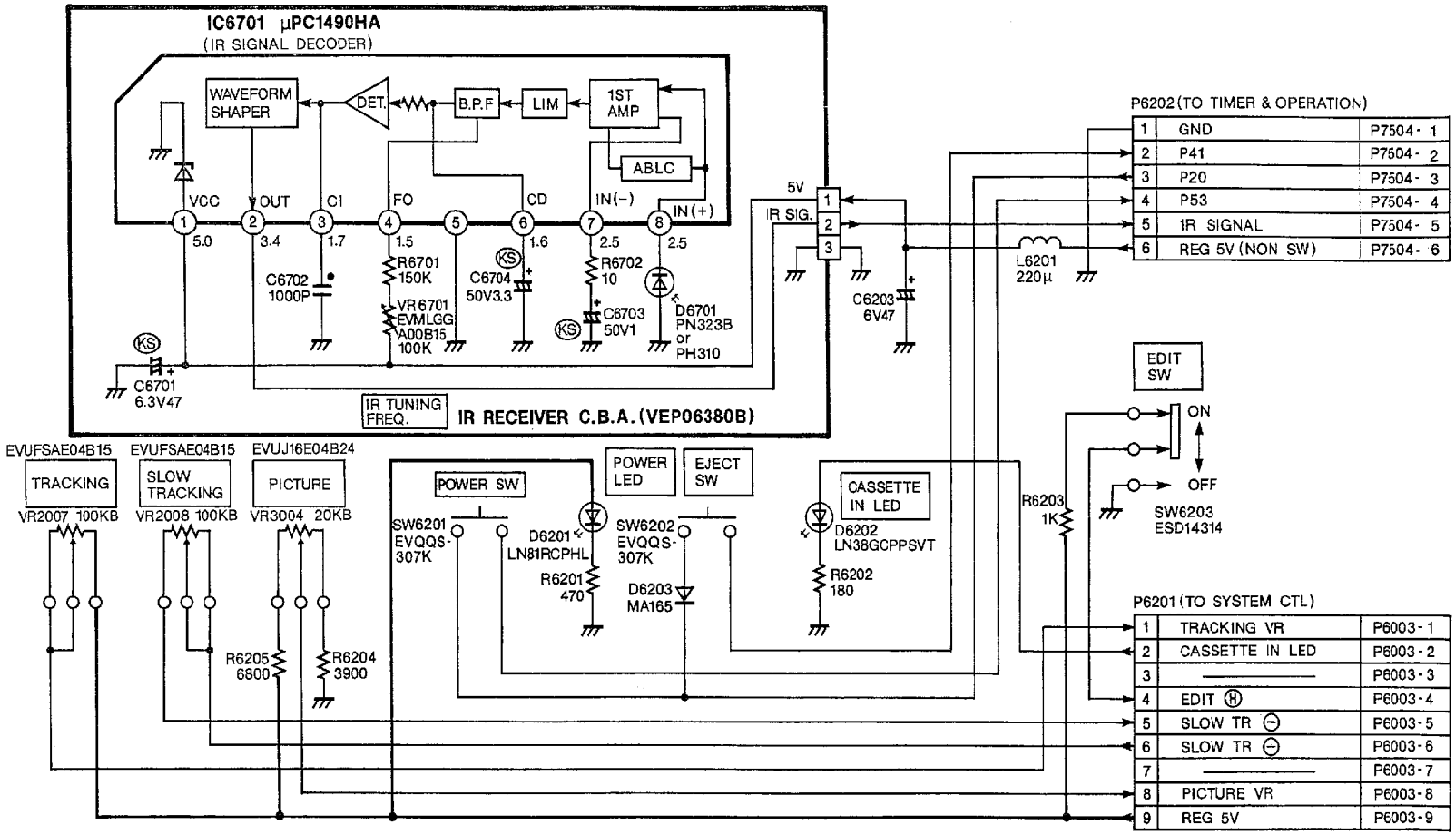
REF. NO. / MODE	Q4001			Q4002			Q4003			Q4004		
	E	C	B	E	C	B	E	C	B	E	C	B
PLAY	0	0.3	0.3	0	0	0.8	0	0	0.7	12.3	12.2	11.5
REC	0	11.4	0.9	−27.1	0	−34.9	−27.1	0	−35.3	12.3	−13.0	12.2

AUDIO Section IC VOLTAGE CHART

REF. NO. / MODE	IC4001																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	5.6	0.6	5.6	12.2	5.6	12.3	5.6	6.2	6.2	6.2	6.2	6.2	0	5.5	0	6.2	11.5	0	6.2	4.5
REC	5.6	0.6	5.6	12.2	5.6	12.3	5.6	6.2	6.2	6.2	6.2	6.2	0.5	5.5	0	6.2	12.2	5.0	6.2	0.2
REF. NO. / MODE	IC4001																			
	21	22	23	24																
PLAY	6.2	0.3	0.3	0																
REC	6.2	0.6	0.6	0																

Next Page:
OPERATION Section

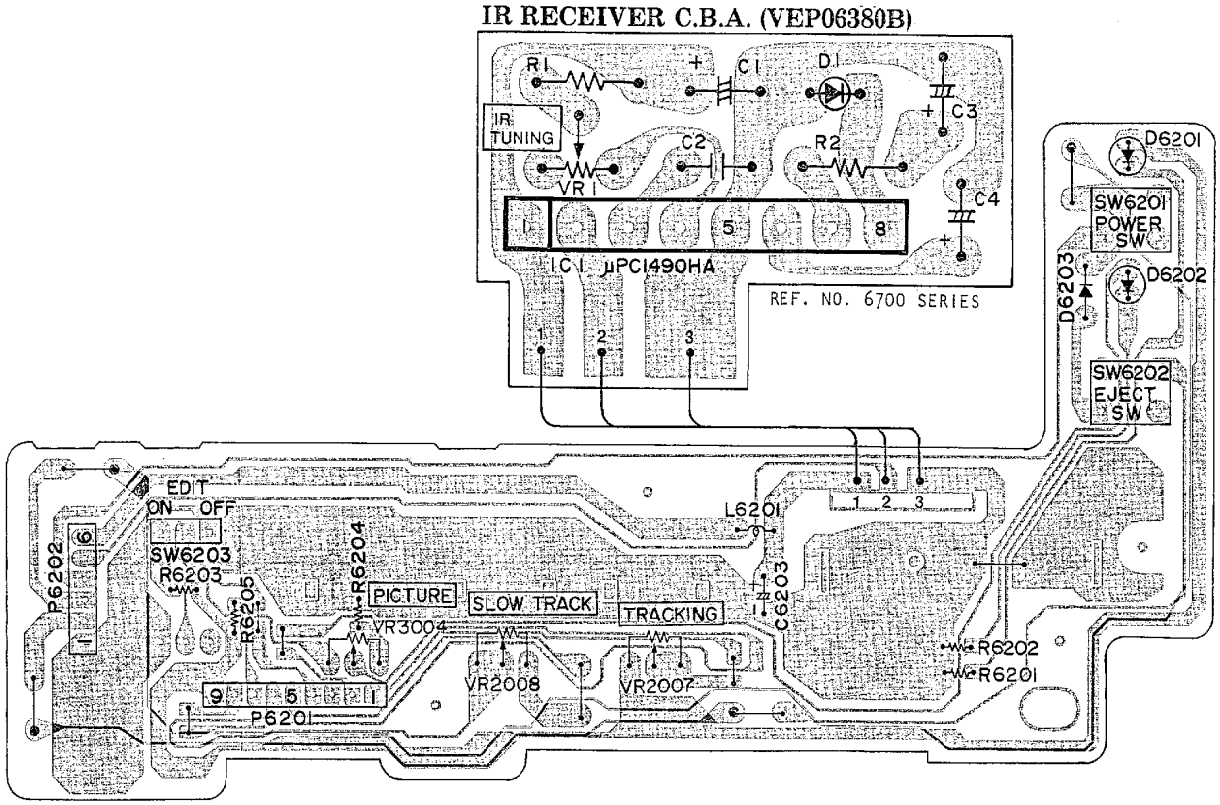
3-24. OPERATION SCHEMATIC DIAGRAM



NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

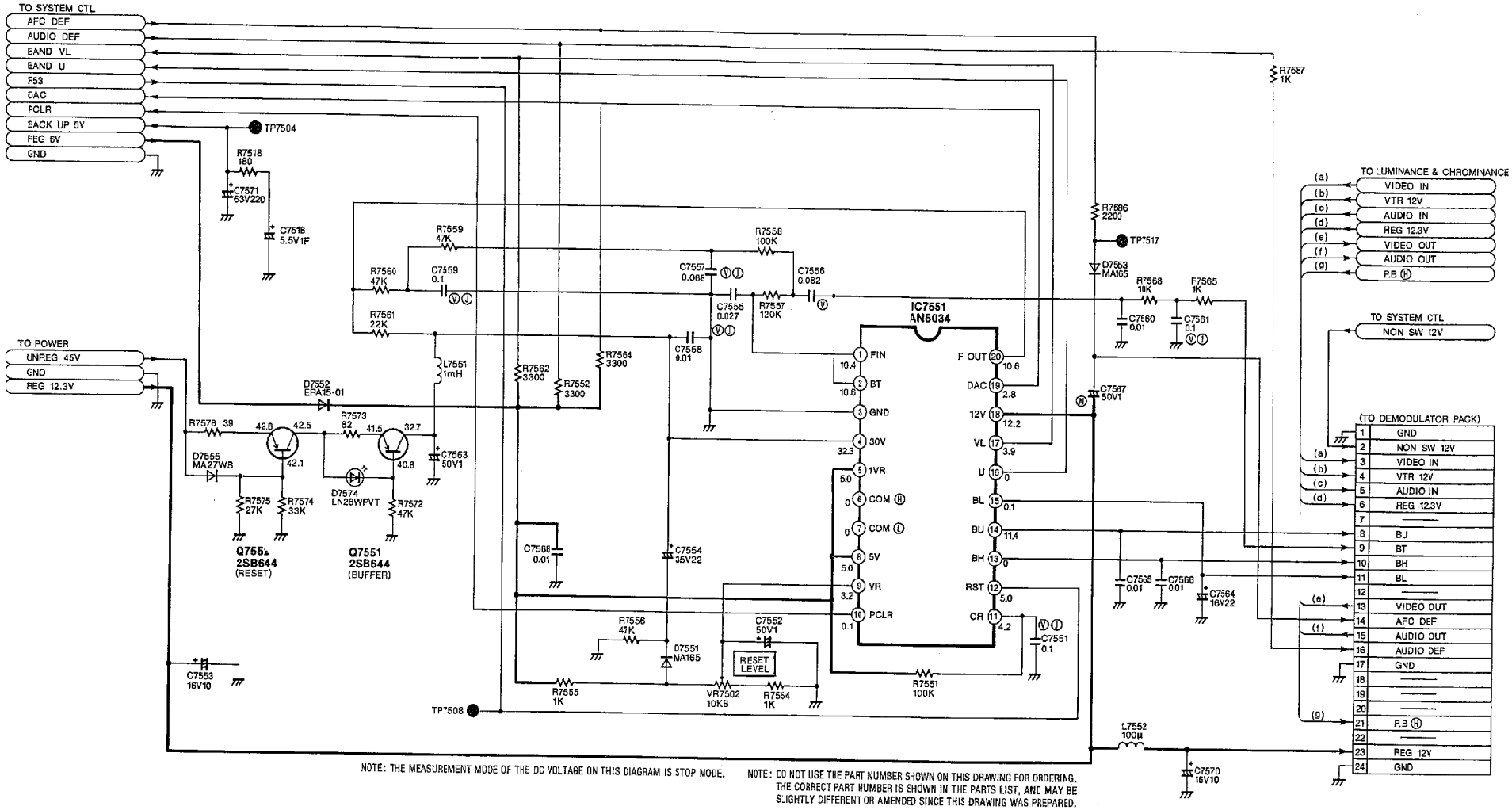
3-25. OPERATION C.B.A. (VEP06388A)



OPERATION IC VOLTAGE CHART

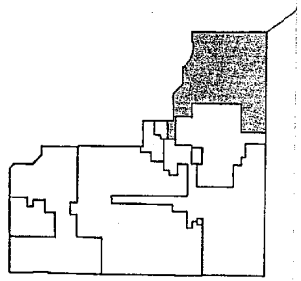
REF. NO. / MODE	IC6701							
	1	2	3	4	5	6	7	8
STOP	5.0	3.4	1.7	1.5	0	1.6	2.5	2.5

3-26 CH SELECT SCHEMATIC DIAGRAM

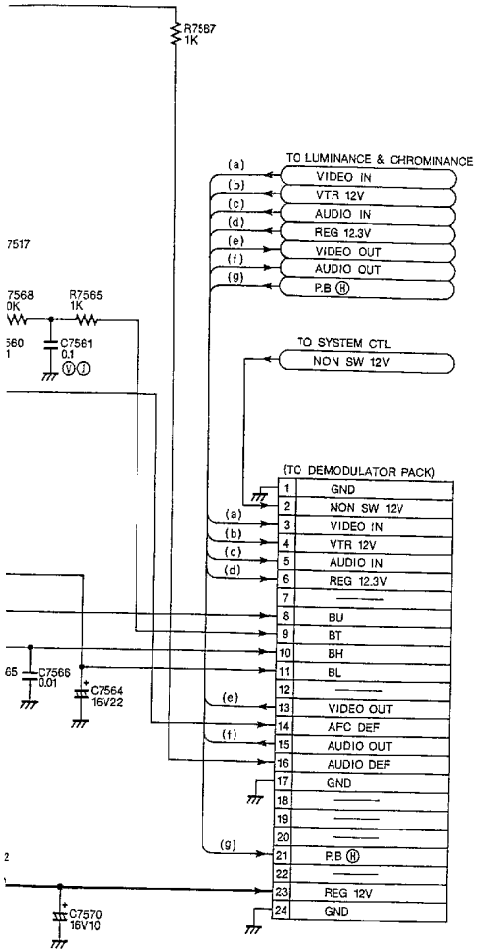


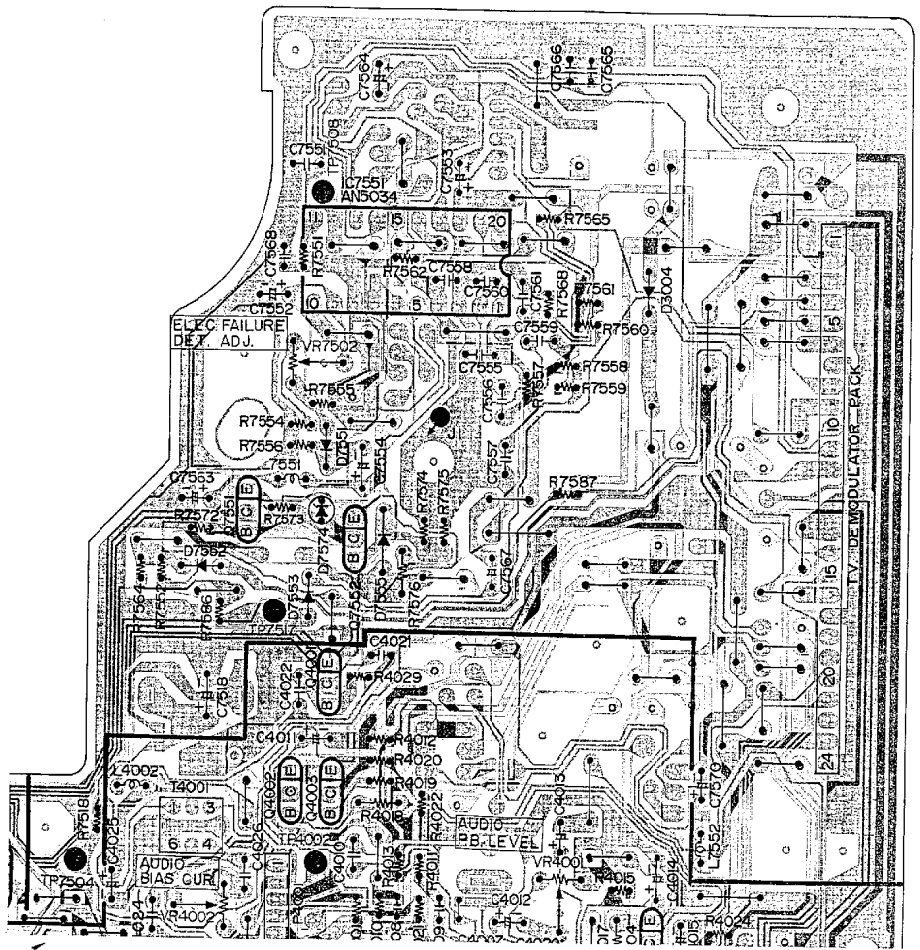
NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

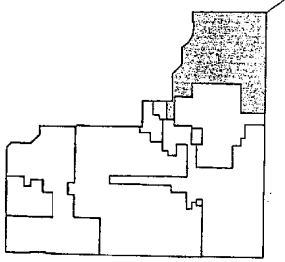
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.



3-27 CH SELECT Section In Main C B A (VEP03395A: NV-G20EN) (VEP03395B: NV-G20A) (VEP03395C: NV-G20EA)







CH SELECT Section IC VOLTAGE CHART

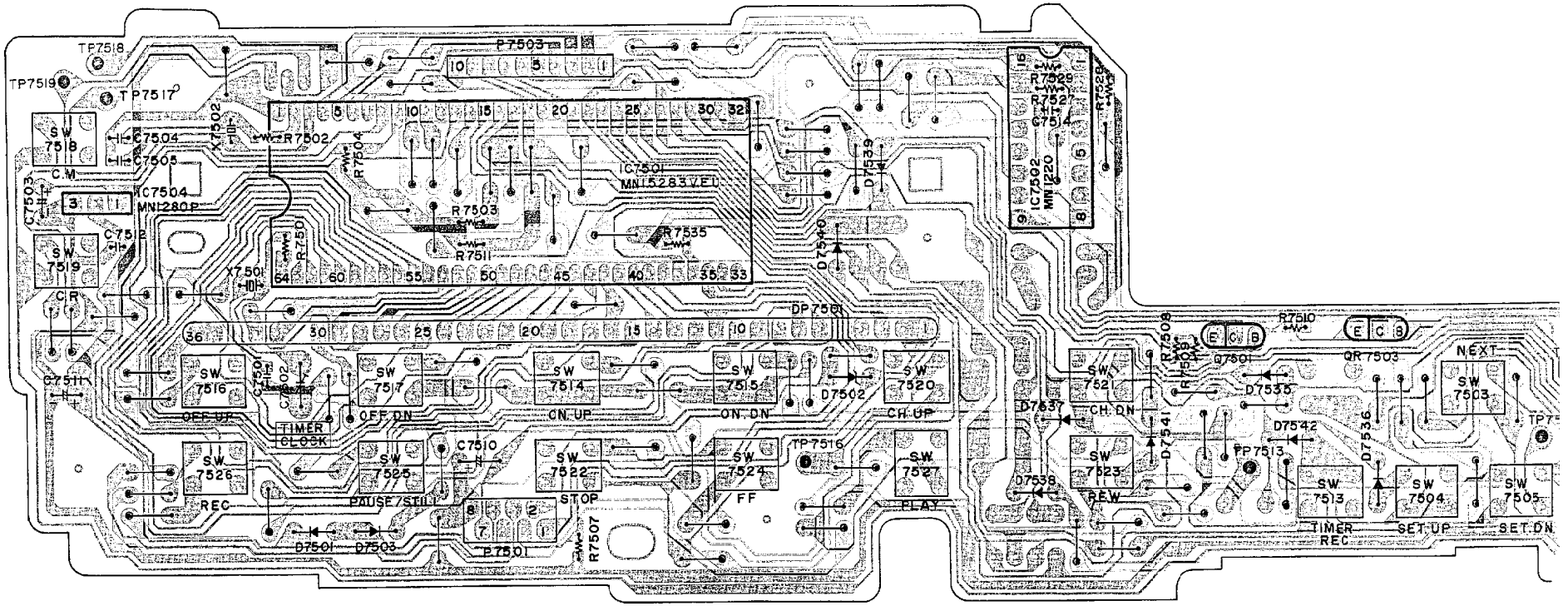
REF. NO. / MODE	IC7551																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	10.4	10.6	0	32.3	5.0	0	0	5.0	3.2	0.1	4.2	5.0	0	11.4	0.1	0	3.9	12.2	2.8	10.6

CH SELECT Section TRs VOLTAGE CHART

REF. NO.	Q7551			Q7552																
MODE	E	C	B	E	C	B														
STOP	41.5	32.7	40.8	42.8	42.5	42.1														

Next Page: TIMER Section

3-28. TIMER C.B.A. (VEP07370A)

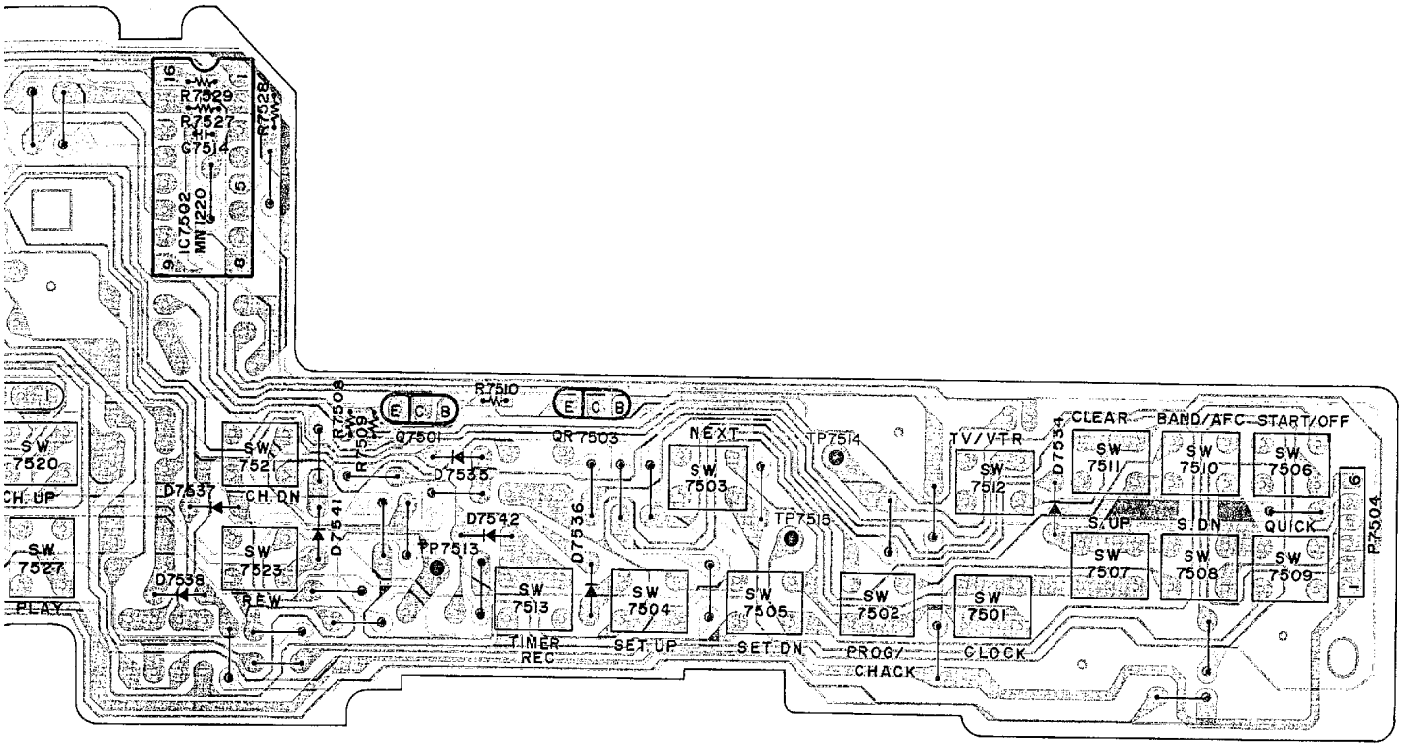


TIMER ICs VOLTAGE CHART

REF. NO.	IC7501																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	0	2.7	1.8	3.5	0.1	0.2	5.0	4.6	5.0	0	4.8	3.7	5.3	5.0	5.0	5.0	5.0	5.0	4.7	4.7
REF. NO.	IC7501																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
STOP	4.8	3.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0	5.0	4.2	-29.3	-27.3	-27.4	-27.3	-27.2
REF. NO.	IC7501																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
STOP	-27.2	-27.2	-27.2	-27.0	-27.7	-27.5	-27.5	-27.5	-27.5	-27.1	-27.5	-27.5	-25.9	4.9	4.9	4.9	-29.8	-29.8	-29.8	-26.7
REF. NO.	IC7501																			
MODE	61	62	63	64																
STOP	4.8	5.0	2.3	2.6																
REF. NO.	IC7502																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
STOP	4.8	0	5.0	0	0	0	5.0	5.0	-30.5	-6.5	0.1	0	0	0	4.8	0				
REF. NO.	IC7504																			
MODE	1	2	3																	
STOP	5.0	5.0	0																	

TIMER TRs VO

REF. NO.	Q7501		
MODE	E	C	B
STOP	-30.5	-30.5	-2



RT

IC7501													
7	8	9	10	11	12	13	14	15	16	17	18	19	20
5.0	4.6	5.0	0	4.8	3.7	5.0	5.0	5.0	5.0	5.0	5.0	4.7	4.7

IC7501													
27	28	29	30	31	32	33	34	35	36	37	38	39	40
5.0	5.0	5.0	5.0	5.0	5.0	0	5.0	4.2	−29.3	−27.3	−27.4	−27.3	−27.2

IC7501													
47	48	49	50	51	52	53	54	55	56	57	58	59	60
−27.5	−27.5	−27.5	−27.7	−27.5	−27.5	−25.9	4.9	4.9	4.9	−29.8	−29.8	−29.8	−26.7

IC7501													

IC7502													
7	8	9	10	11	12	13	14	15	16				
5.0	5.0	−30.5	−6.5	0.1	0	0	0	4.8	0				

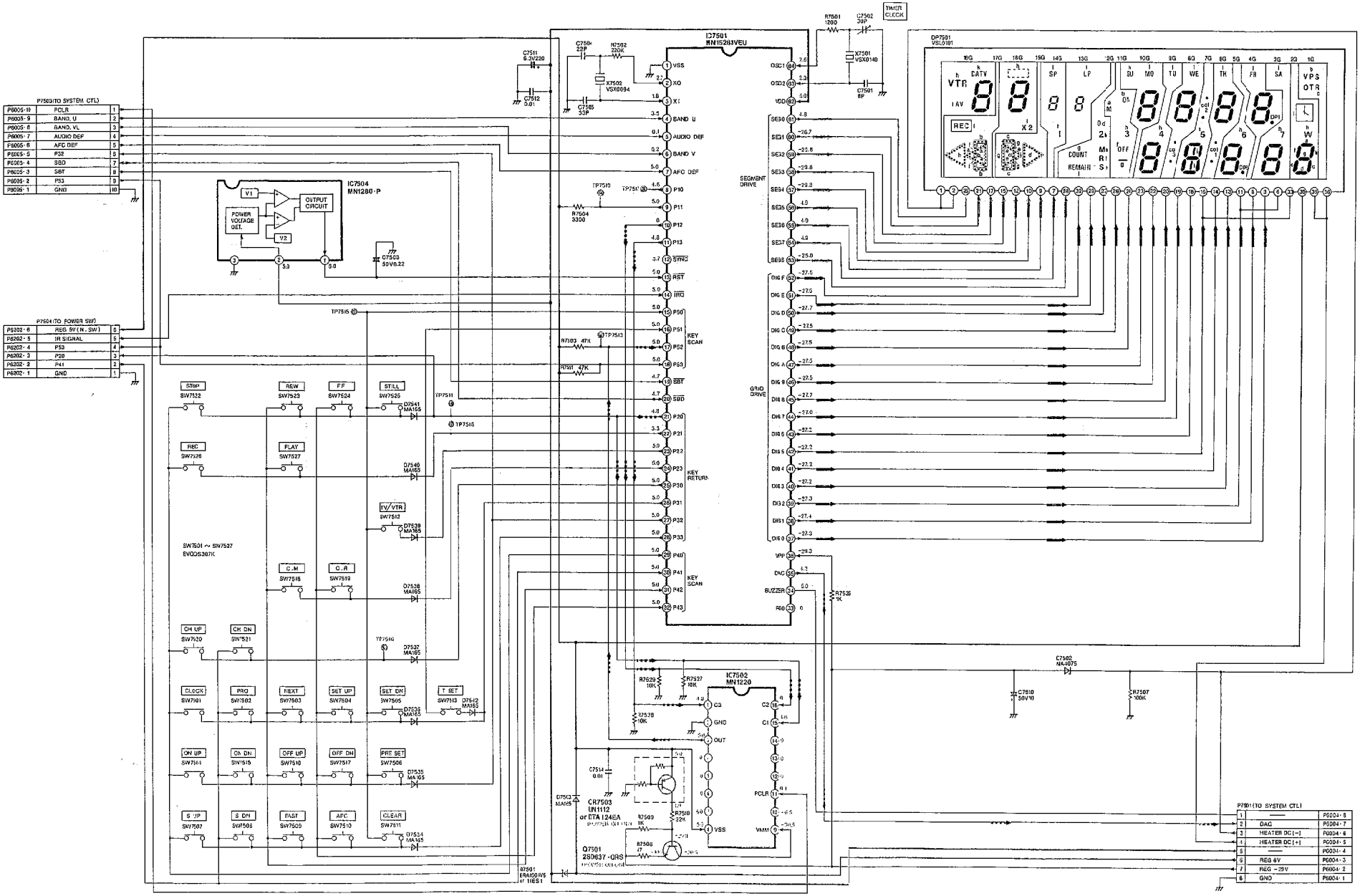
IC7504													

TIMER TRs VOLTAGE CHART

REF. NO.	Q7501								QR7503							
MODE	E	C	B						E	C	B					
STOP	−30.5	−30.6	−29.8						5.0	4.9	0					

3-29 TIMER SCHEMATIC DIAGRAM

SEGMENT CONTROL SIGNAL GRID CONTROL SIGNAL TUNE CONTROL SIGNAL

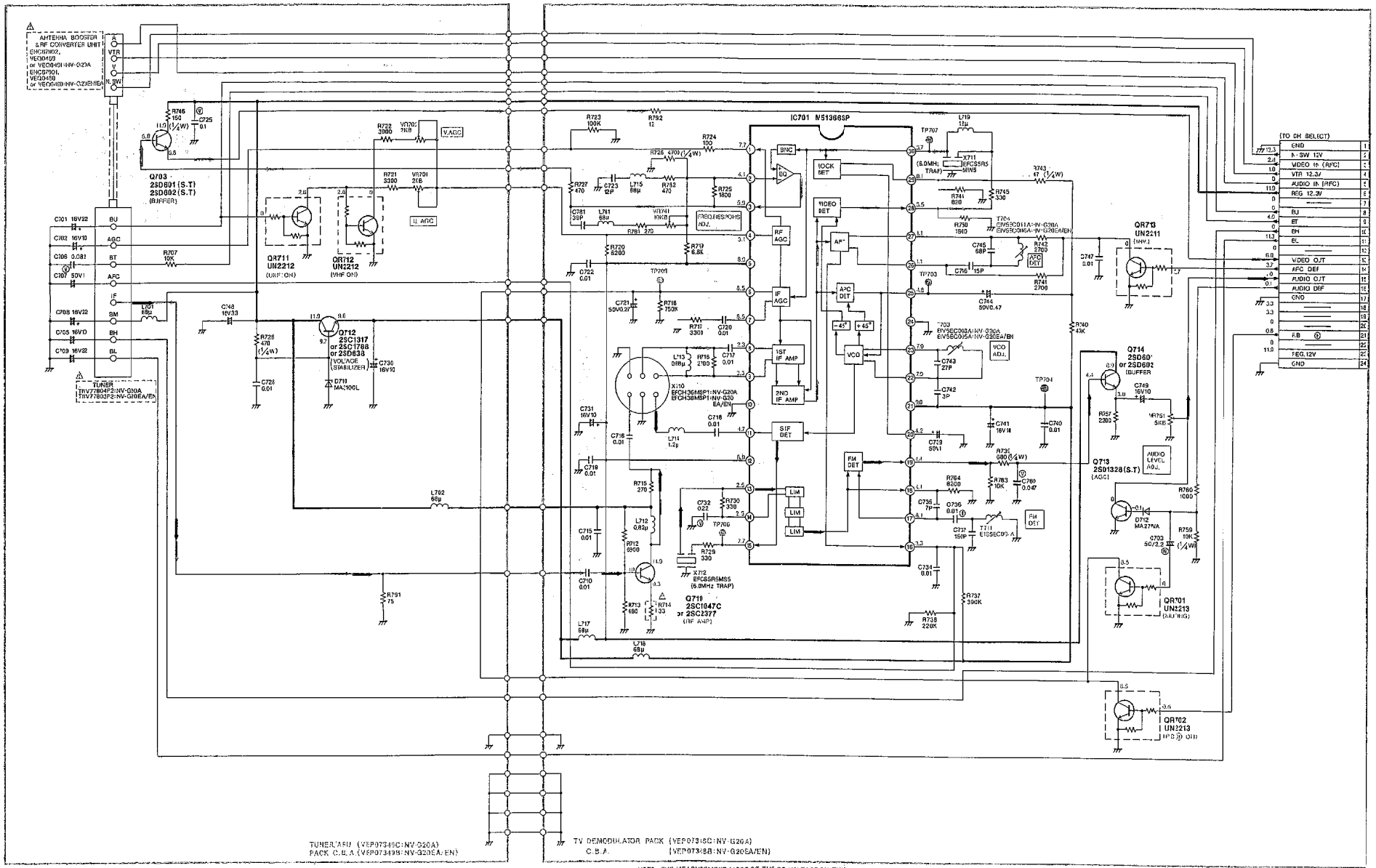


3—17

3-30 TV DEMODULATOR PACK & TUNER/ARU PACK SCHEMATIC DIAGRAM

AUDIO SIGNAL PATH

VIDEO SIGNAL PATH



NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

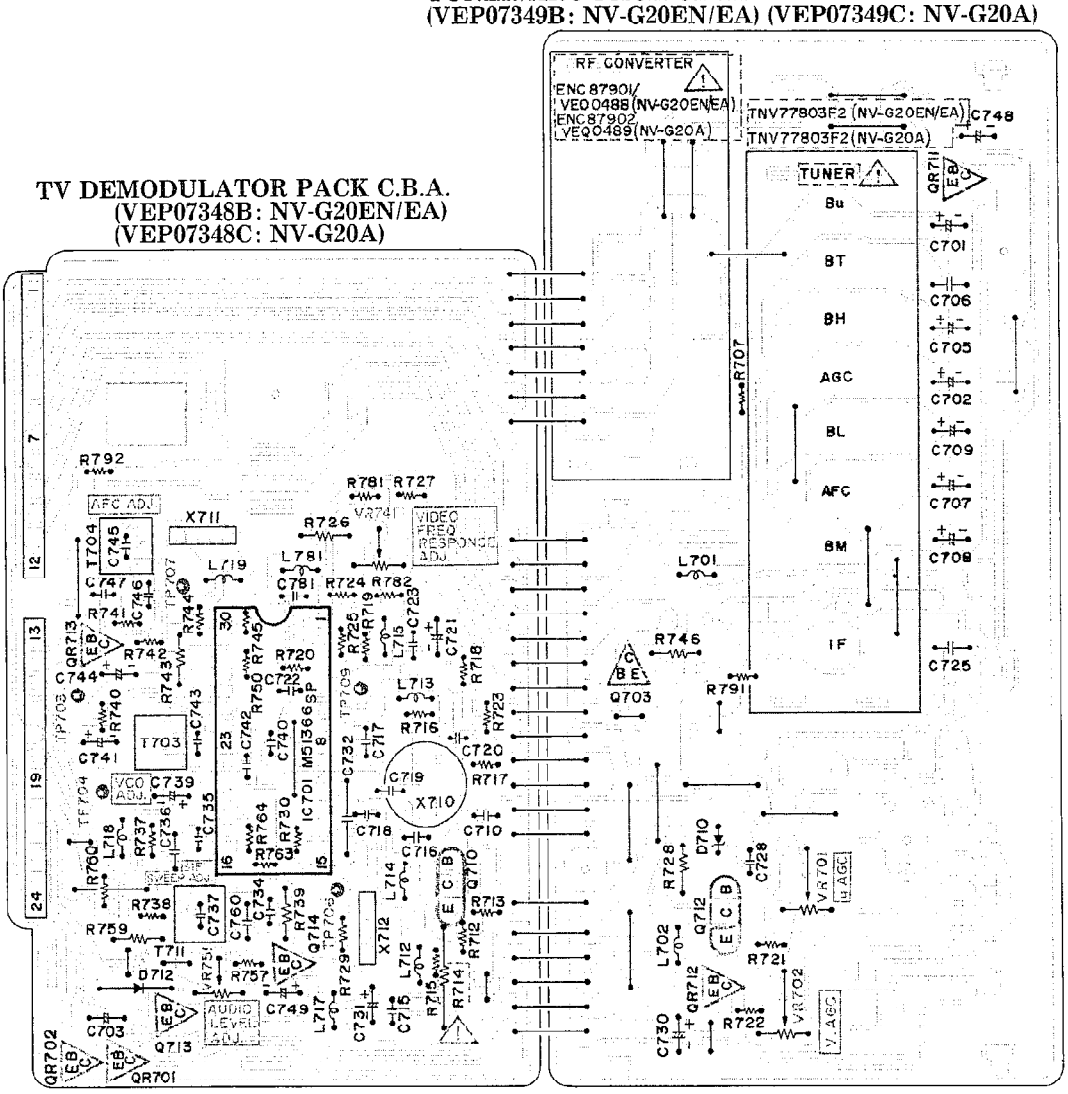
Back Page: TIMER Section

3—18

3-31. TV DEMODULATOR PACK C.B.A. (VEP07348B: NV-G20EN/EA) (VEP07348C: NV-G20A) & TUNER/ARU PACK C.B.A. (VEP07349B: NV-G20EN/EA) (VEP07349C: NV-G20A)

TUNER/ARU PACK C.B.A.
(VEP07349B: NV-G20EN/EA) (VEP07349C: NV-G20A)

TV DEMODULATOR PACK C.B.A.
(VEP07348B: NV-G20EN/EA)
(VEP07348C: NV-G20A)



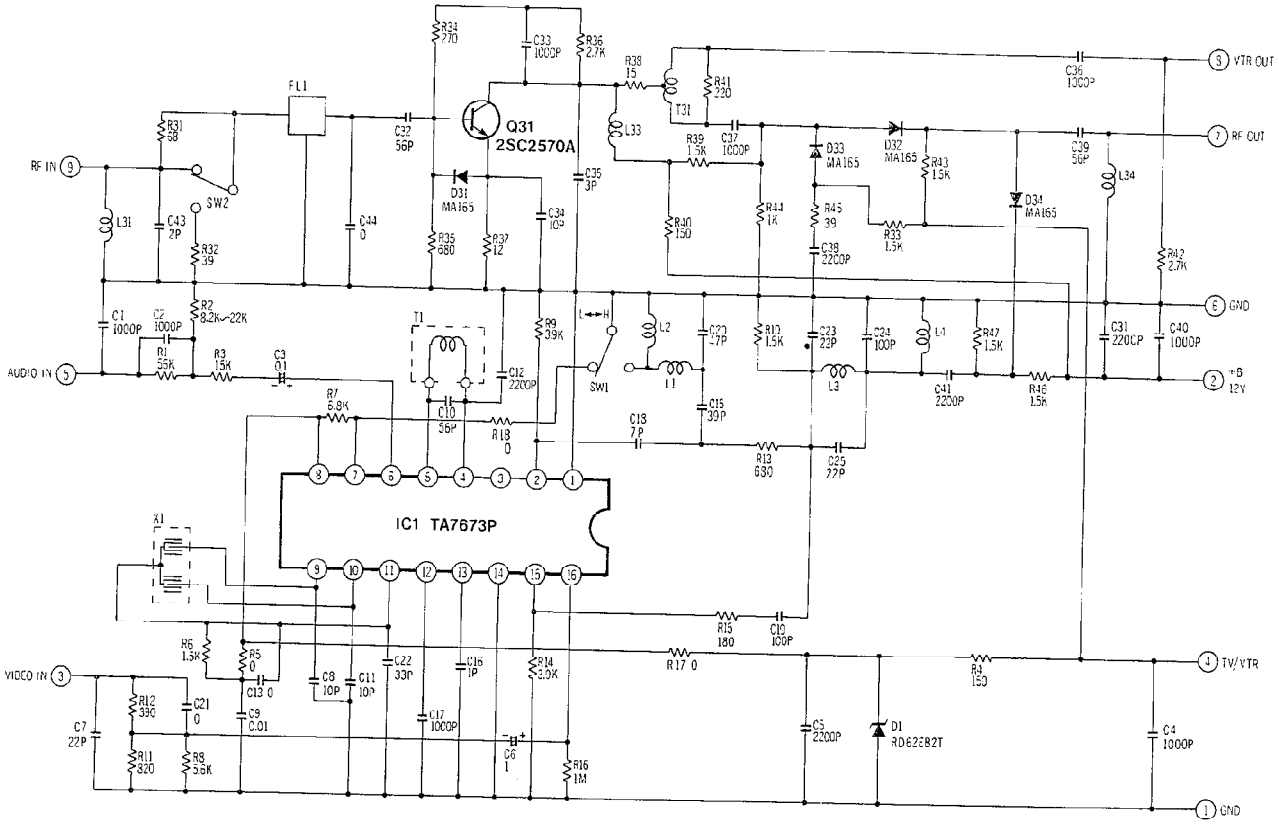
TV DEMODULATOR & TUNER/ARU PACK IC VOLTAGE CHART

REF. NO.	IC701																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	7.7	4.1	5.9	3.1	8.9	8.5	8.5	2.3	2.3	0	4.7	8.9	2.5	2.5	7.7	3.3	6.1	4.1	4.4	4.2
REF. NO.	IC701																			
MODE	21	22	23	24	25	26	27	28	29	30										
STOP	9.0	7.9	7.9	0	4.8	1.1	1.1	3.5	0.1	3.7										
REF. NO.	TV DEMODULATOR PACK																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STOP	0	12.3	2.8	1.0	0	11.9	0	0	4.0	0	11.3	0	6.8	3.7	0	0.1	0	3.3	3.3	0
REF. NO.	TV DEMODULATOR PACK																			
MODE	21	22	23	24																
STOP	0.6	0	11.9	0																

TV DEMODULATOR & TUNER/ARU PACK TRs VOLTAGE CHART

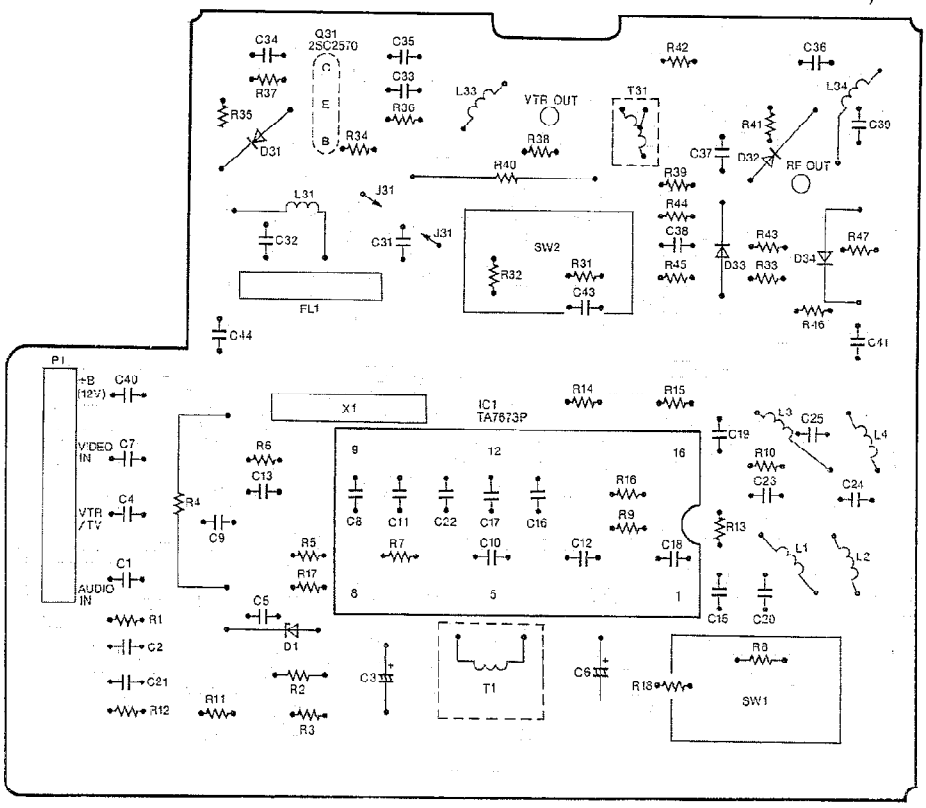
REF. NO.	Q703			Q710			Q712			Q713			Q714					
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B			
STOP	6.8	11.9	5.8	0.3	11.9	1.0	9.0	11.9	9.7	0	0	−0.1	3.8	8.9	4.4			
REF. NO.	QR701			QR702			QR711			QR712			QR713					
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B			
STOP	0	8.5	0	0	8.5	0.6	0	2.6	0	0	0	2.6	0	0	3.7			

3-32. RF CONVERTER SCHEMATIC DIAGRAM (ENC87901: NV-G20EN/EA)

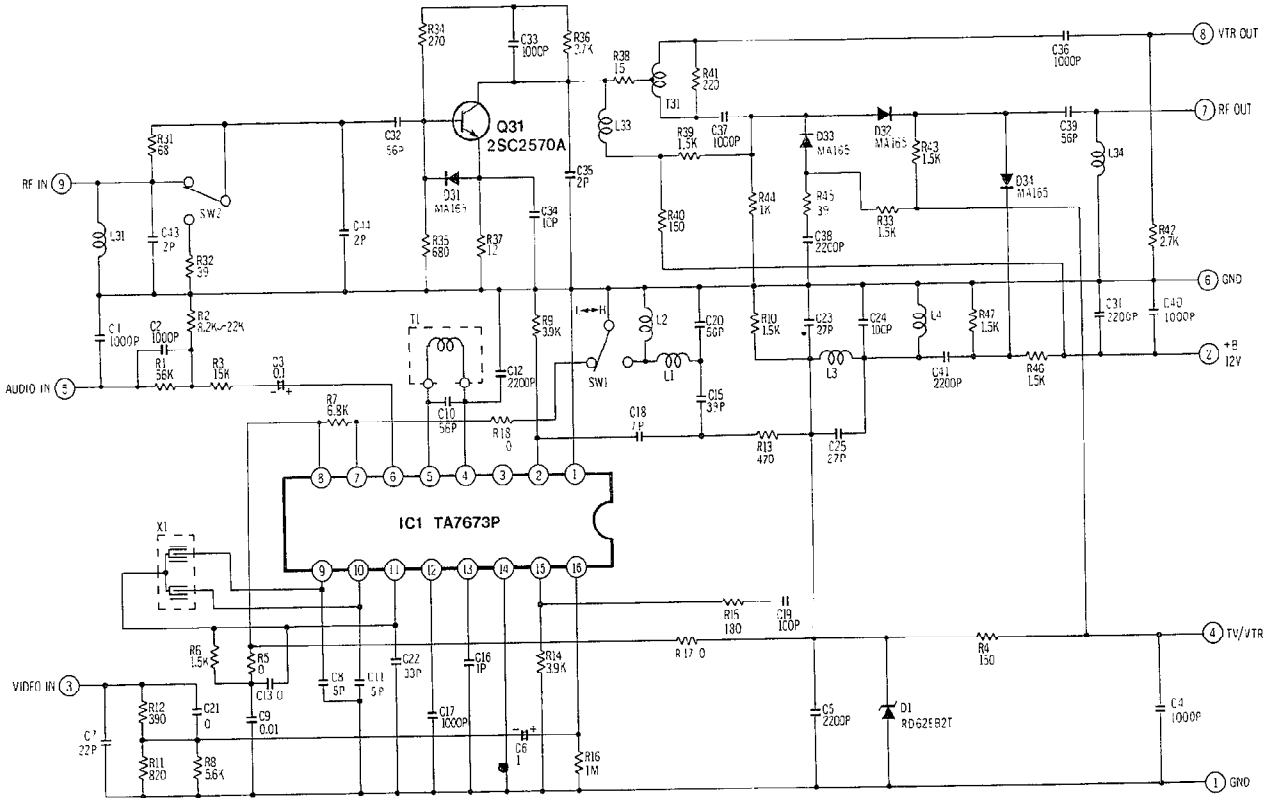


NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

3-33. RF CONVERTER C B A. (ENC87901: NV-G20EN/EA)

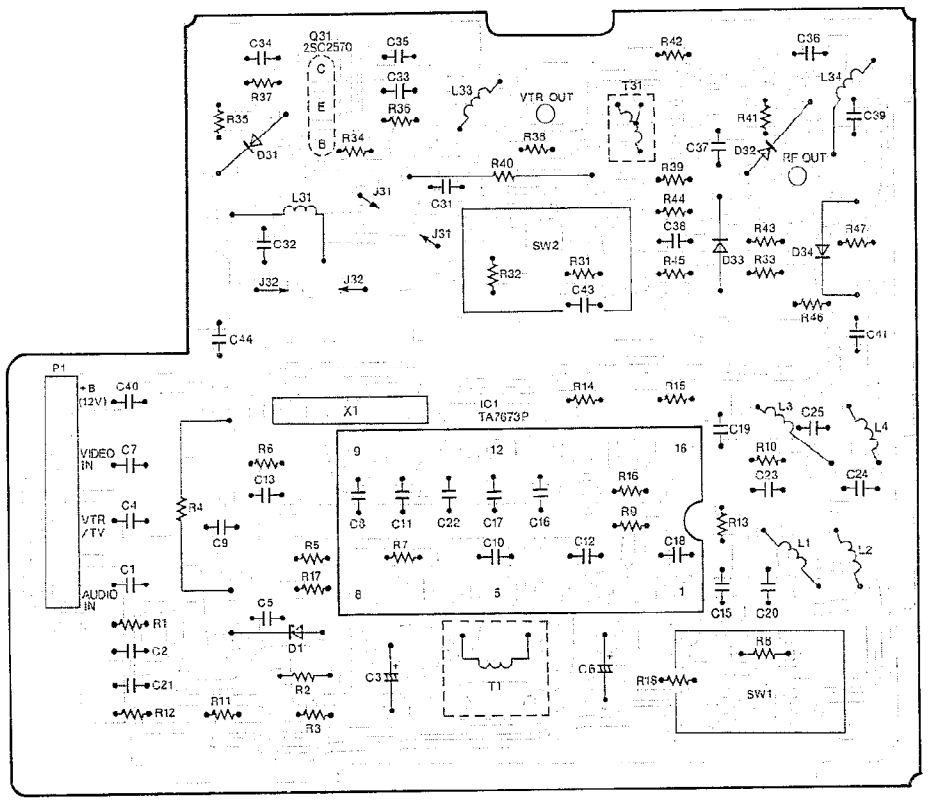


3-34 RF CONVERTER SCHEMATIC DIAGRAM (ENC87902: NV-G20A)

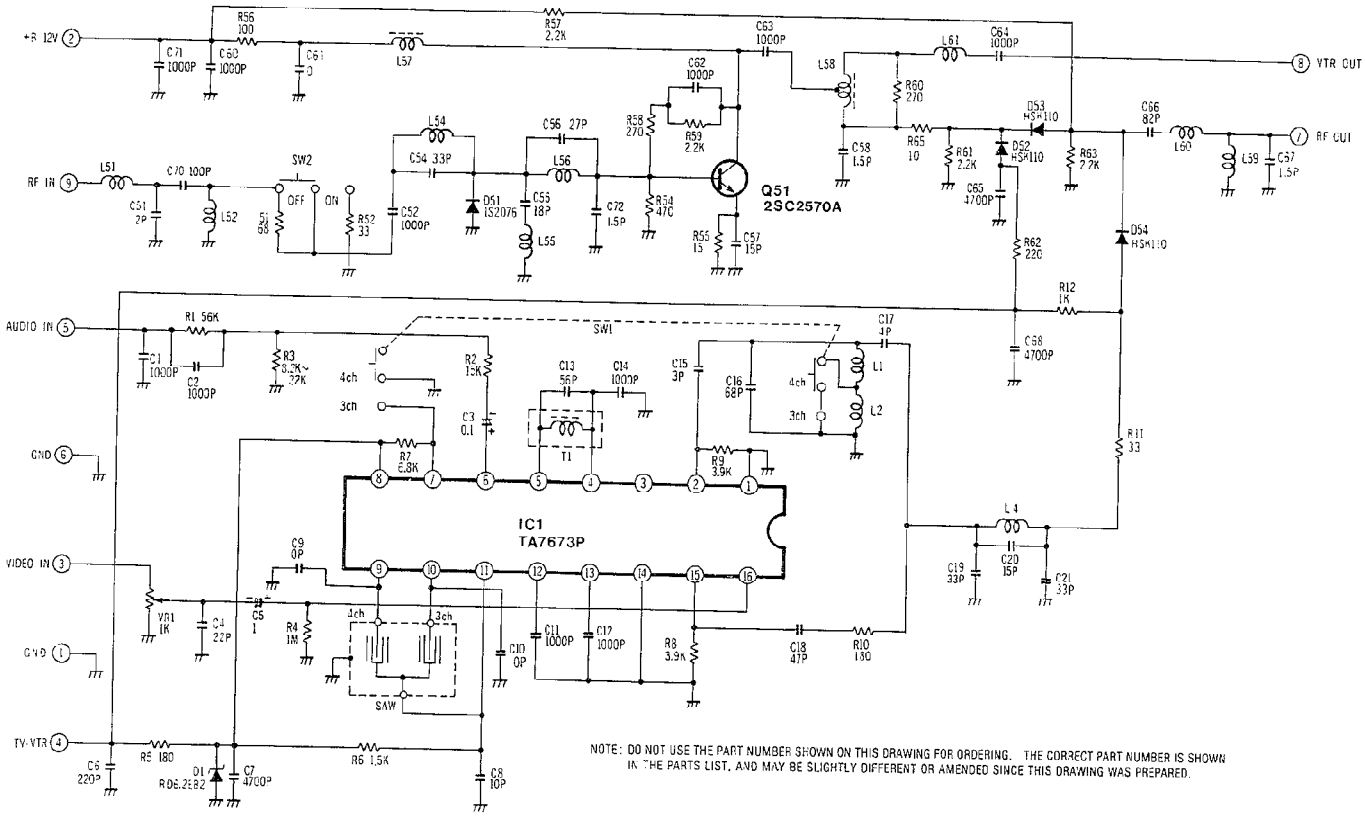


NOTE. DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

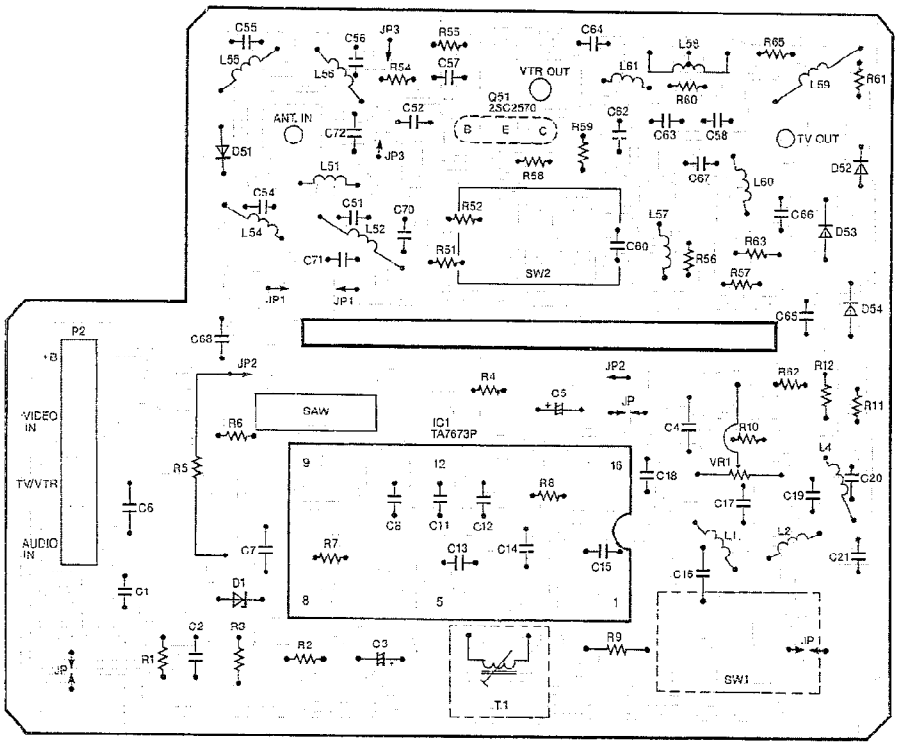
3-35. RF CONVERTER C.B.A. (ENC87902: NV-G20A)



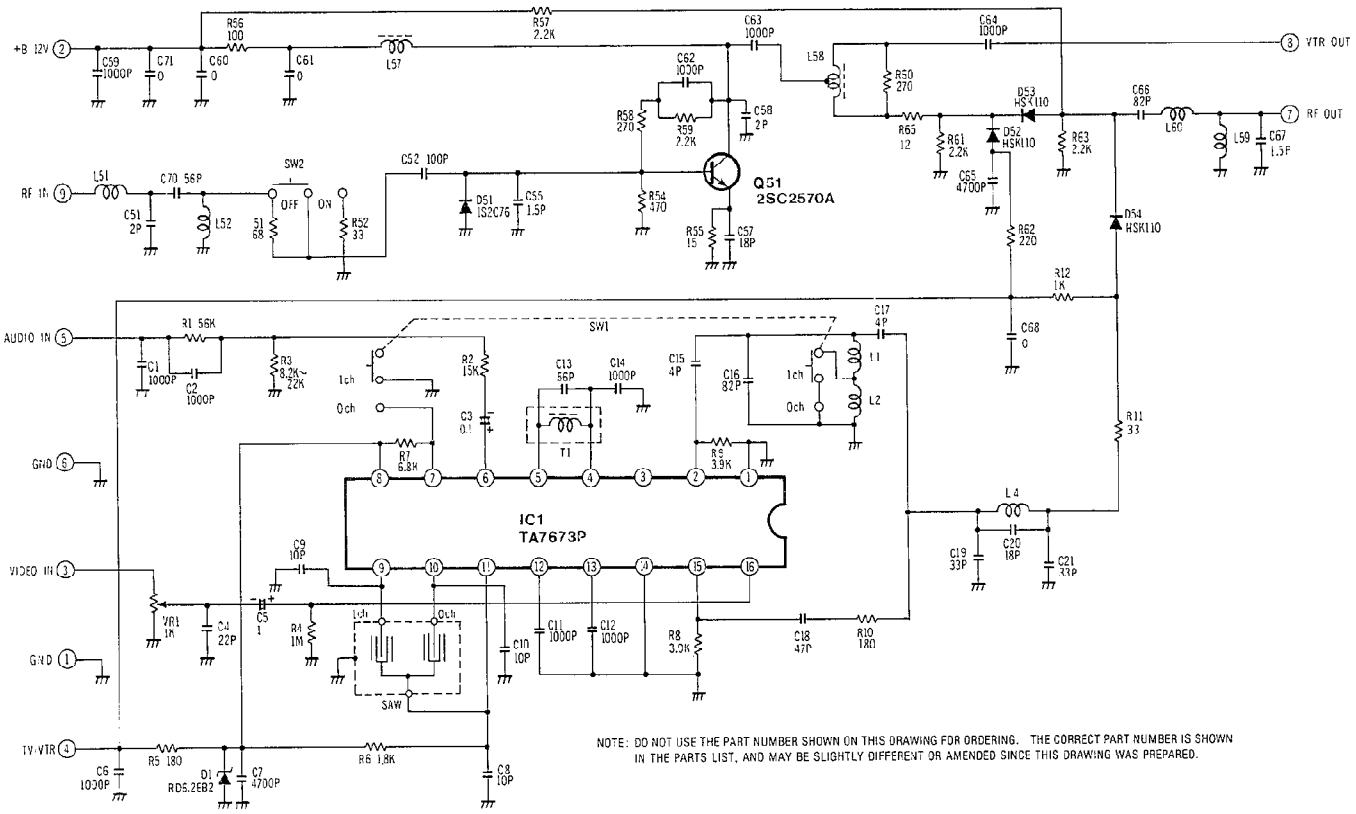
3-36. RF CONVERTER SCHEMATIC DIAGRAM (VEQ0488: NV-G20EN/EA)



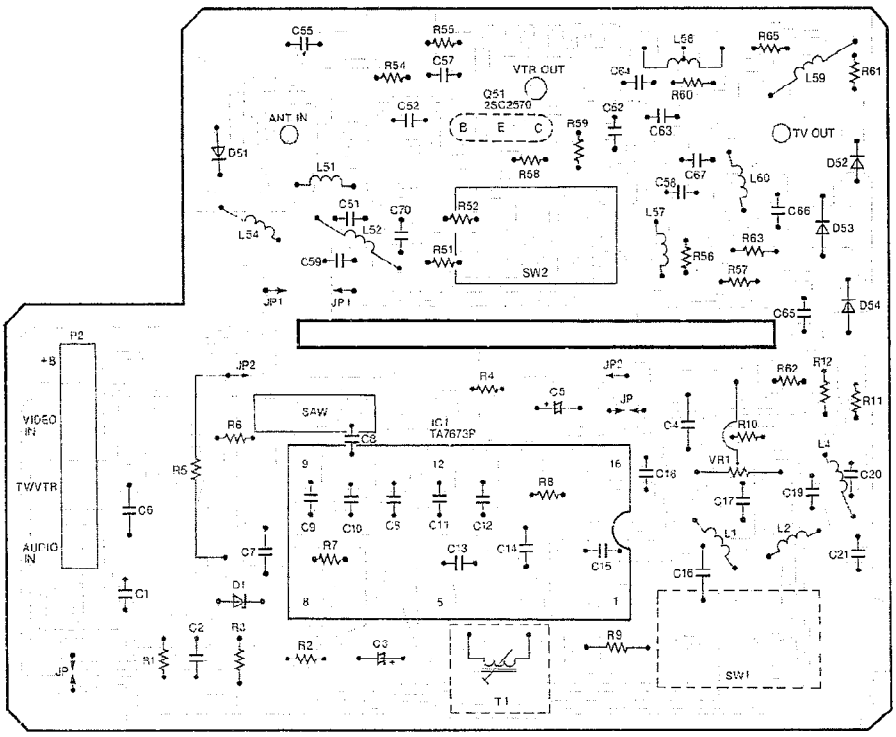
3-37 RF CONVERTER C B A (VEQ0488: NV-G20EN/EA)



3-38 RF CONVERTER SCHEMATIC DIAGRAM (VEQ0489: NV-G20A)

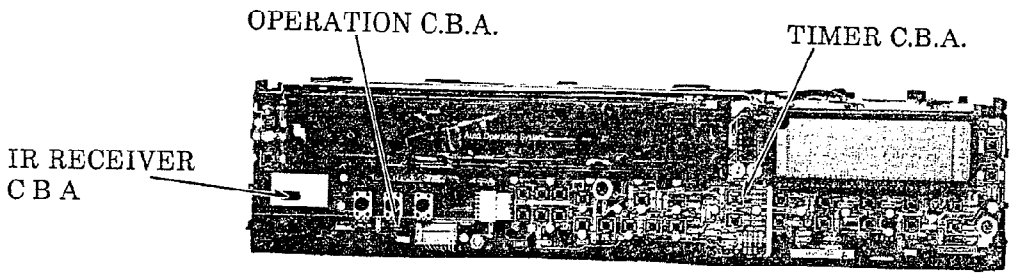


3-39 RF CONVERTER C.B.A. (VEQ0489: NV-G20A)

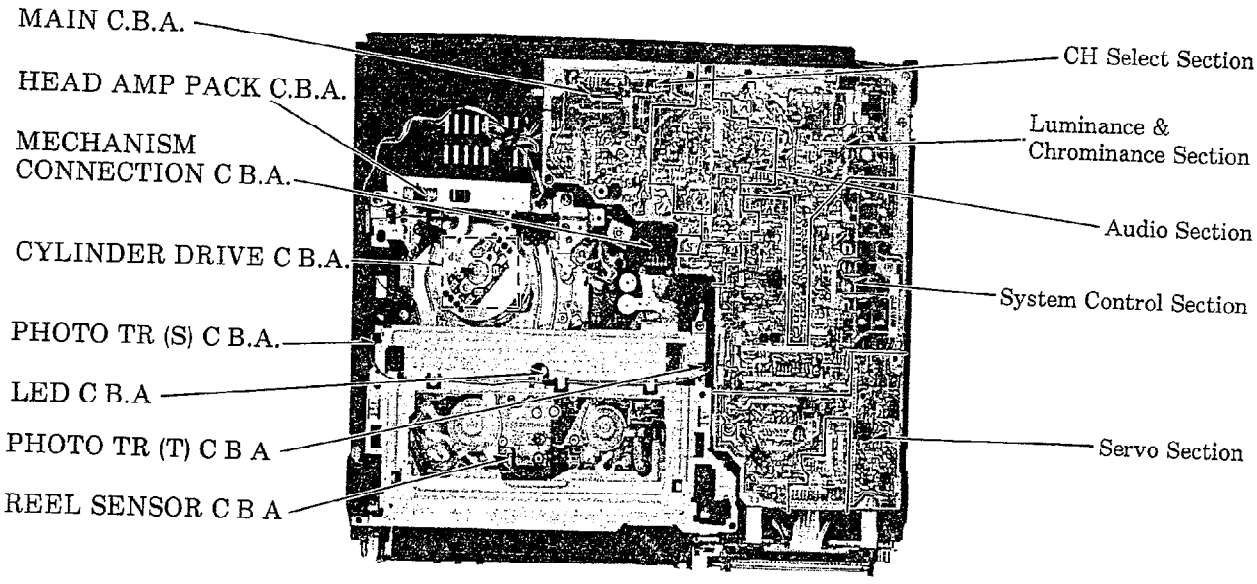


3-42. CIRCUIT BOARD LAYOUT

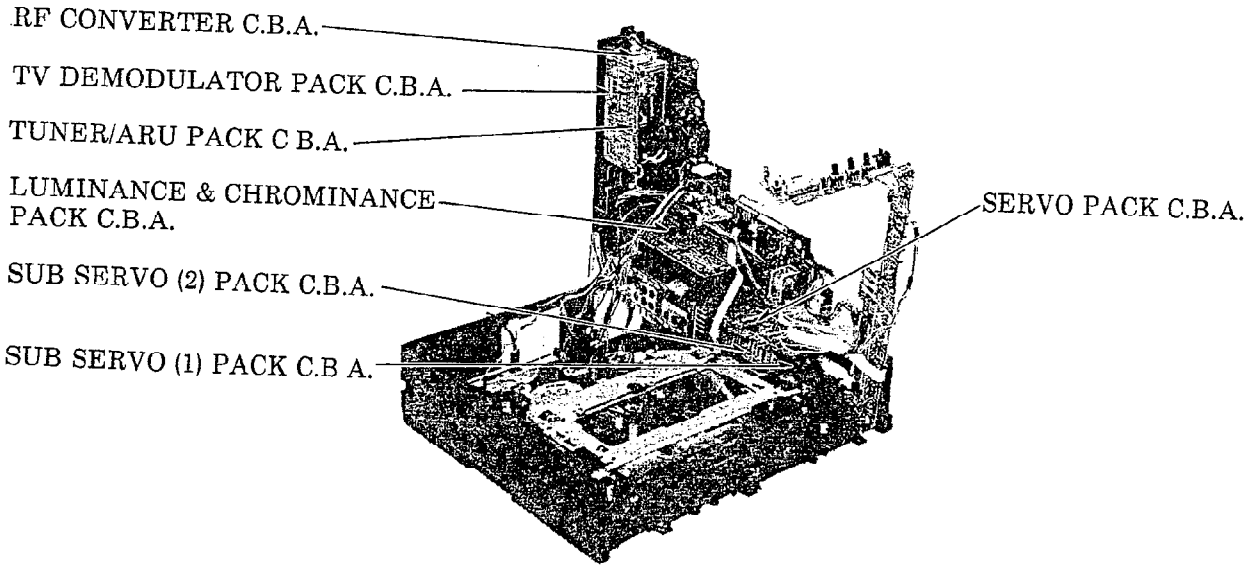
FRONT VIEW



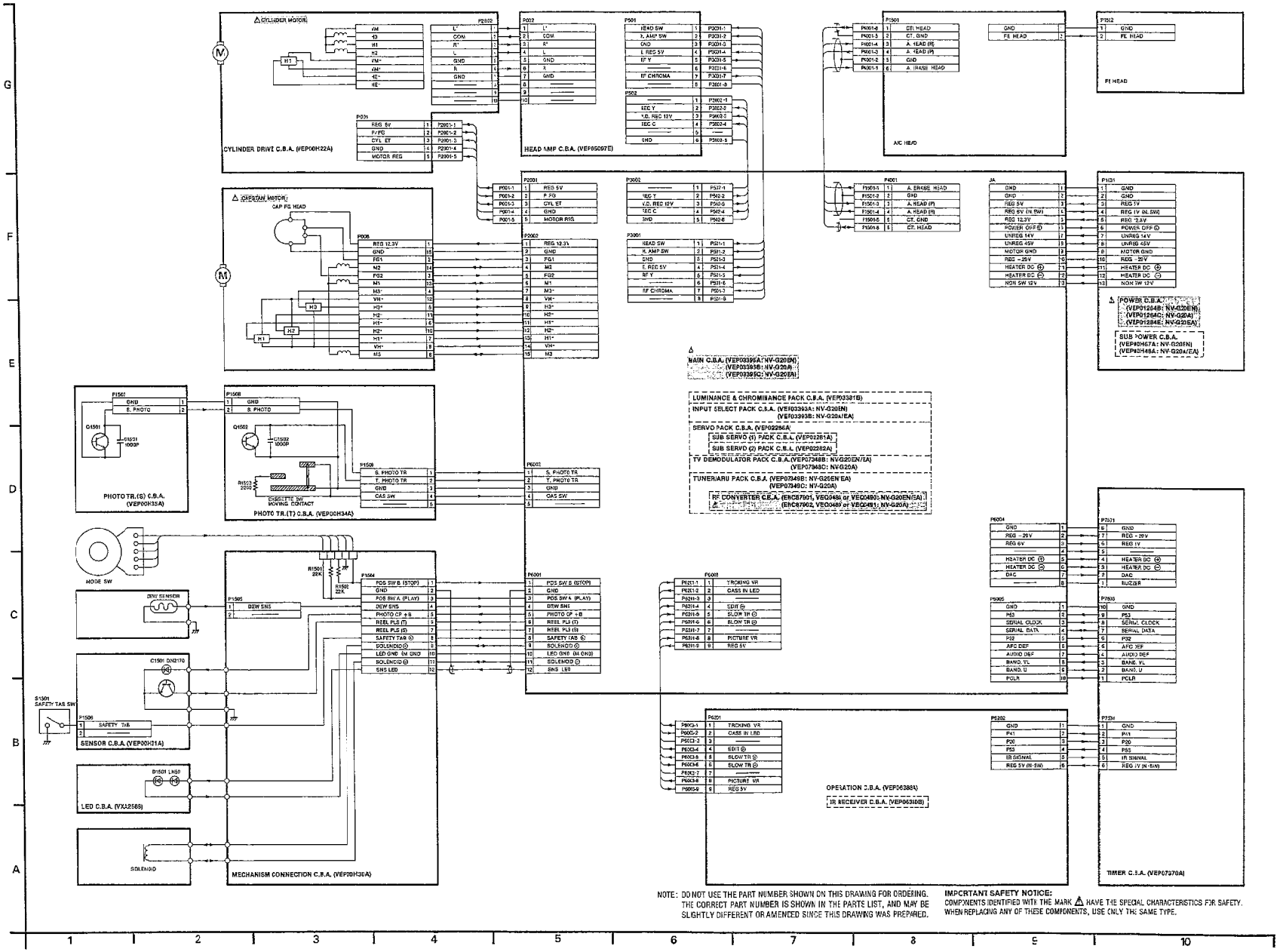
TOP VIEW (1)



TOP VIEW (2)



3-43. INTERCONNECTION SCHEMATIC DIAGRAM



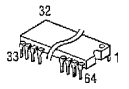
NOTE: DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.

IMPORTANT SAFETY NOTICE:
COMPONENTS IDENTIFIED WITH THE MARK ⚠ HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

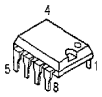
Next Page:
ICs & TFs INFORMATION

3-44. ICs & TRs INFORMATION

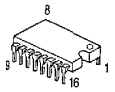
GENERAL CIRCUIT PARTS



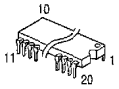
MN15362VJE
MN15283VEU



µPC393C
µPC358C



µPD4510BC
MN1220



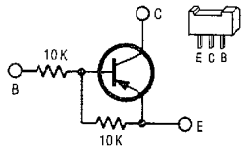
AN5034
AN3224K

MN1280
MN1280P

2SB643, 2SB641
2SB790, 2SC2206
2SD937, 2SB644
2SD638, 2SD639
2SD636, 2SB642
2SD637

2SD893
2SC1317

2SD601
2SC2295
2SB709
2SD1328



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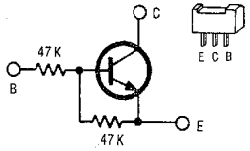

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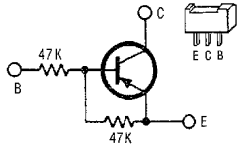

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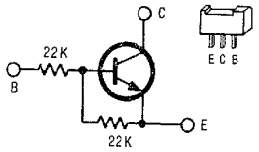
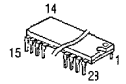


DTC124EA

SERVO



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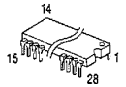
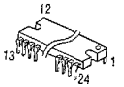


MN1531·VJC



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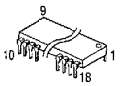
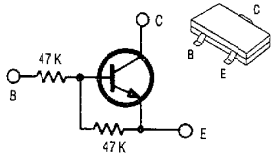
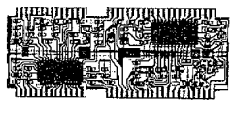


AN3812K

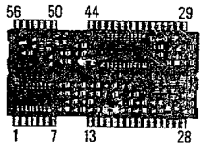
LUMINANCE & CHROMINANCE PACK



UN2213



VEFY017

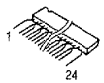


VEFC013

INPUT SELECT PACK

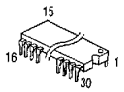
BA7004

AUDIO Section



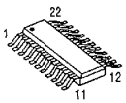
BA7752LS

TV DEMODULATOR & TUNER ARU PACK



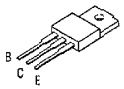
M51366SP

HEAD AMP PACK

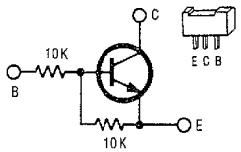


AN3311S

SYSTEM CONTROL Section



2SD1275

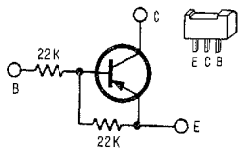


DTC114EA

OPERATION

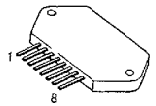
µPC1490HA

TIMER

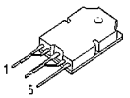


DTA124EA

POWER



TSK5338

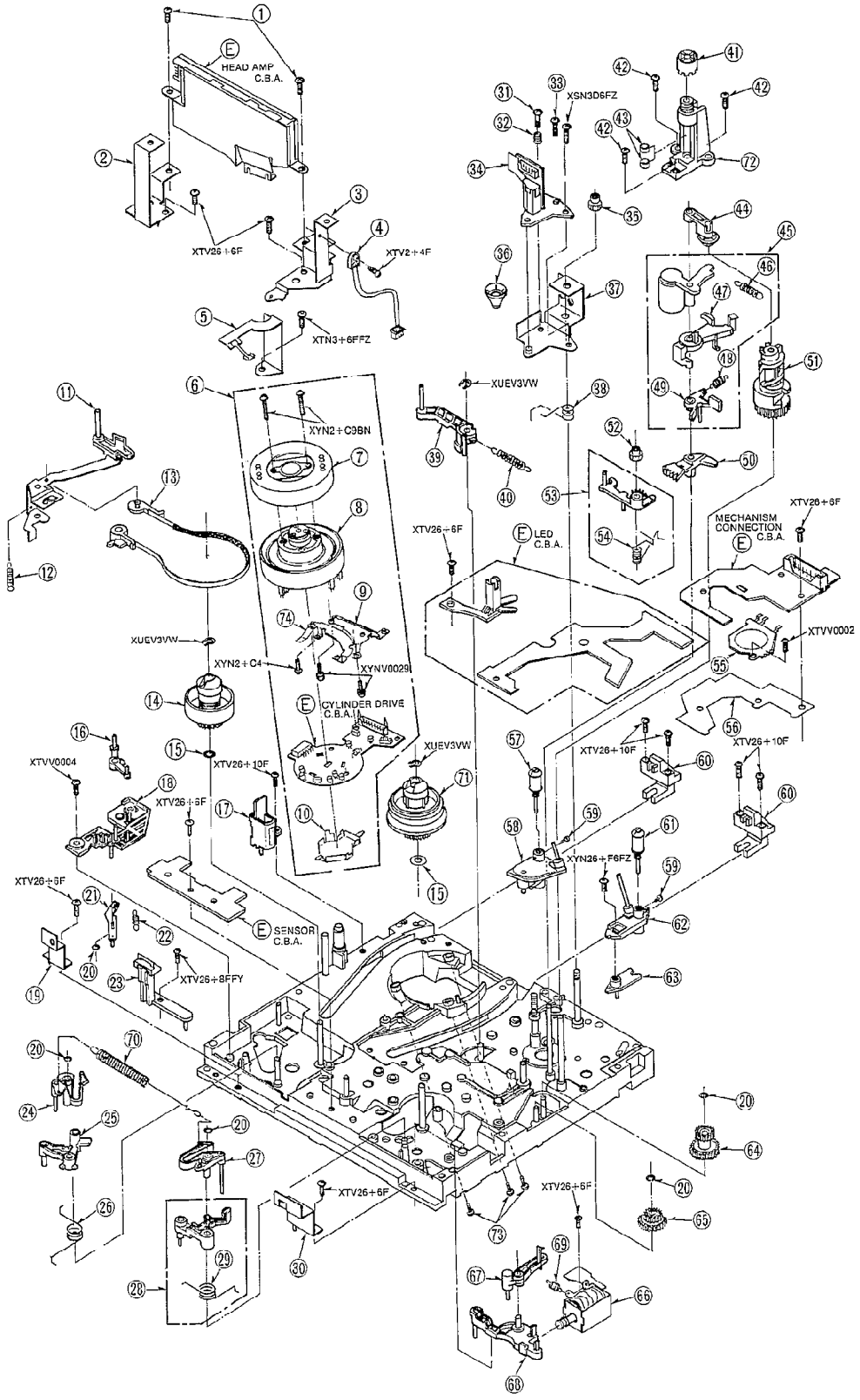


STR11006C,
STR10006C

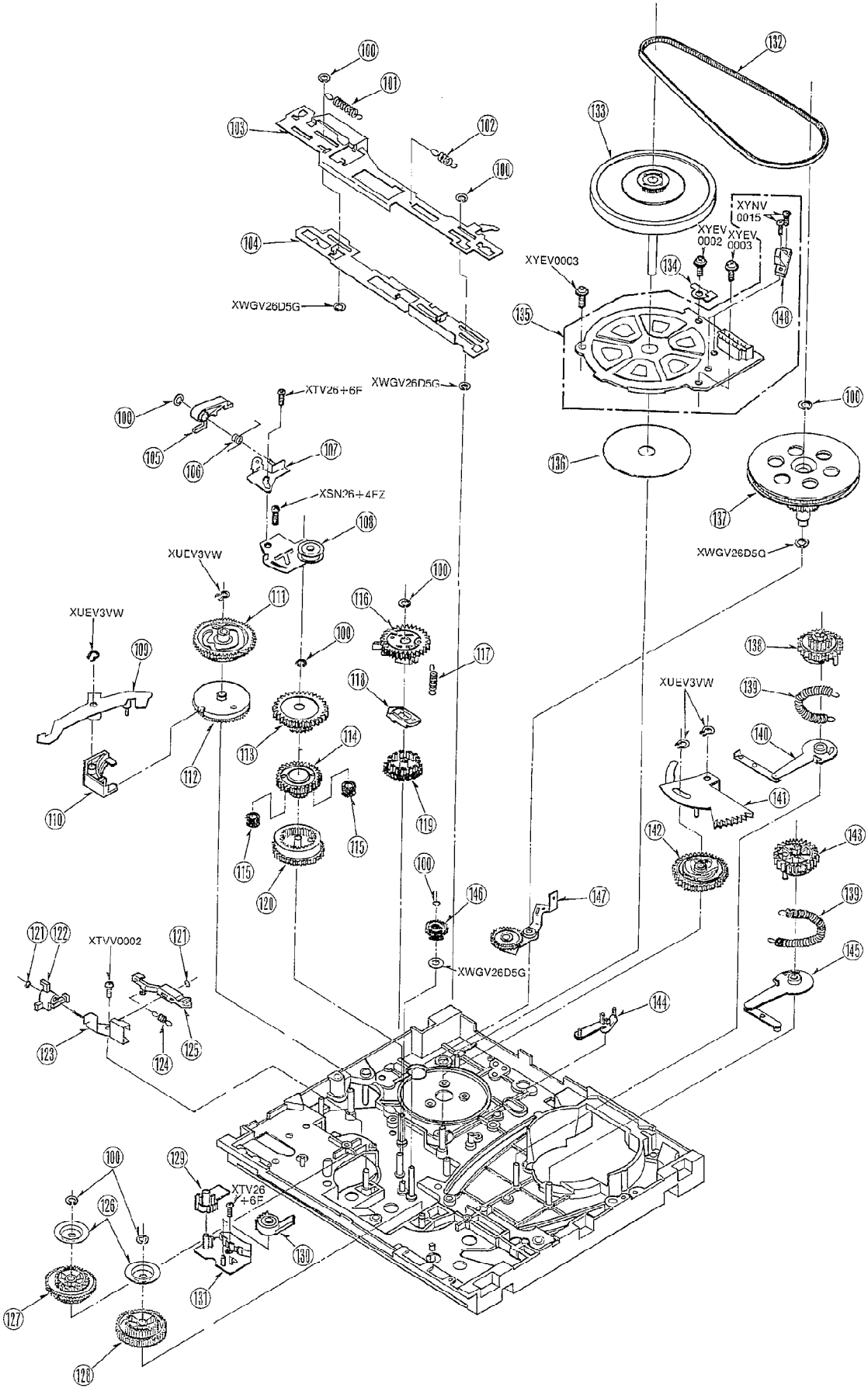
SECTION 4
EXPLODED VIEWS & PARTS LIST

4-1. EXPLODED VIEW

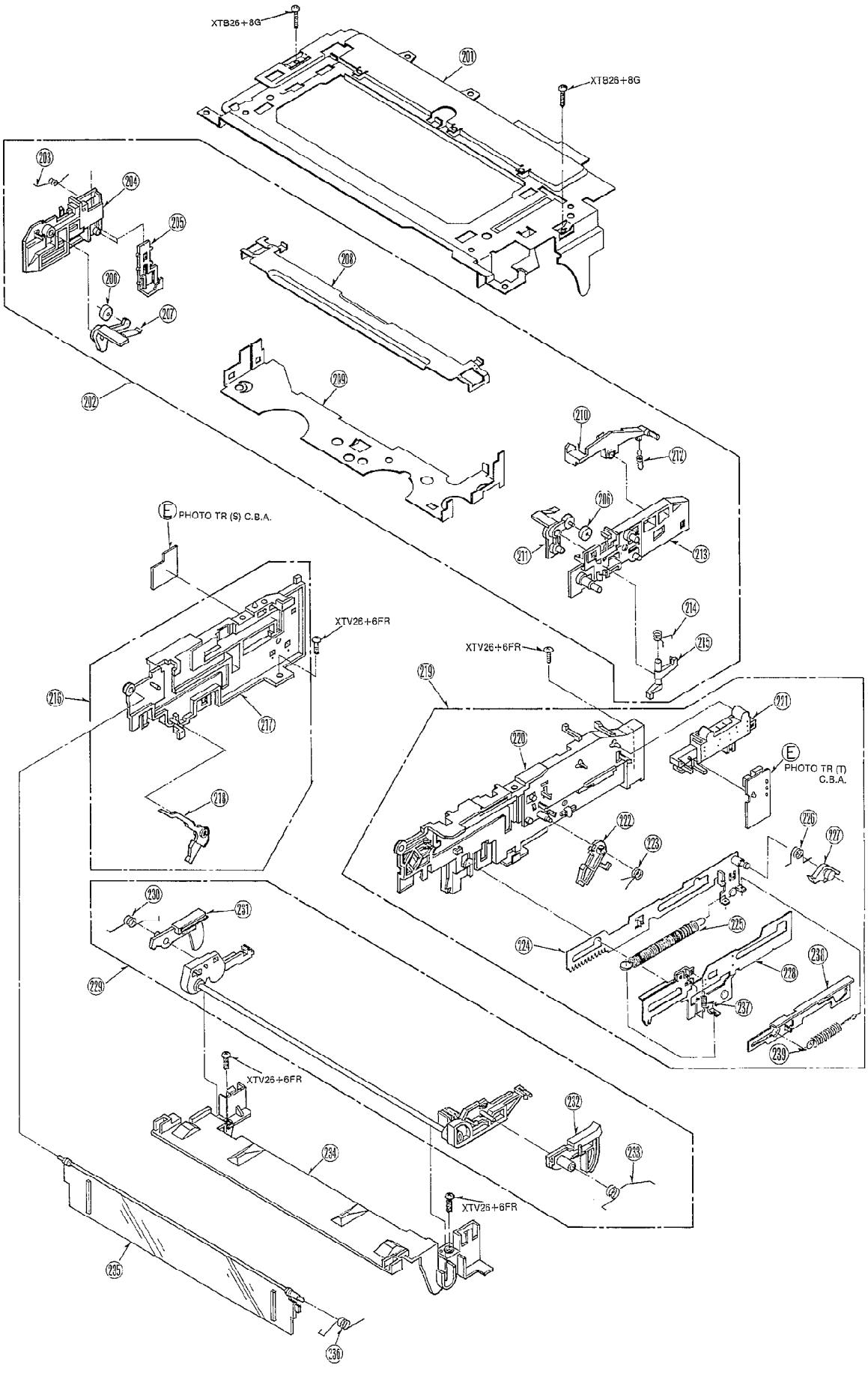
❶ CHASSIS PARTS SECTION (1)



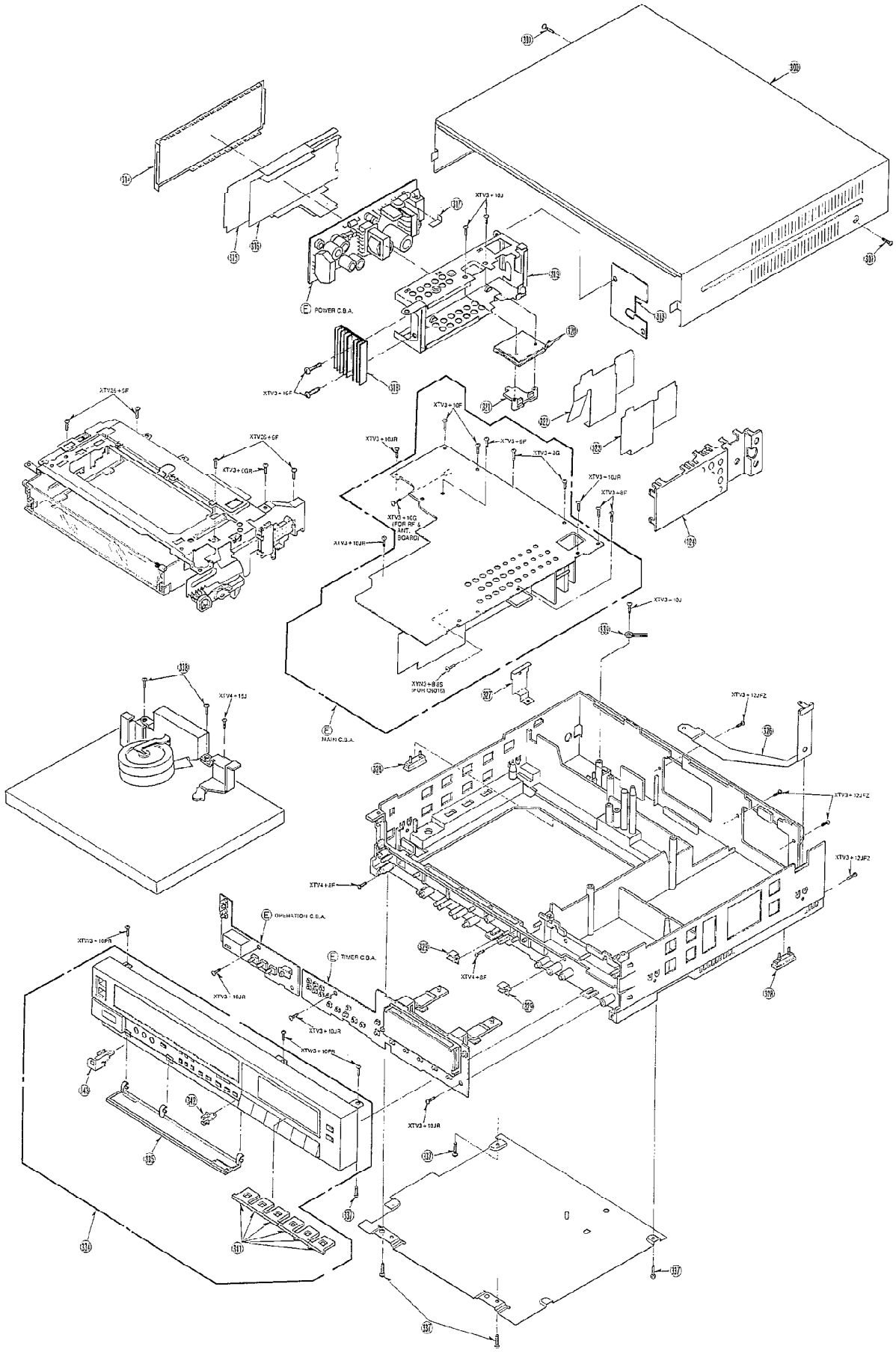
❷ CHASSIS PARTS SECTION (2)



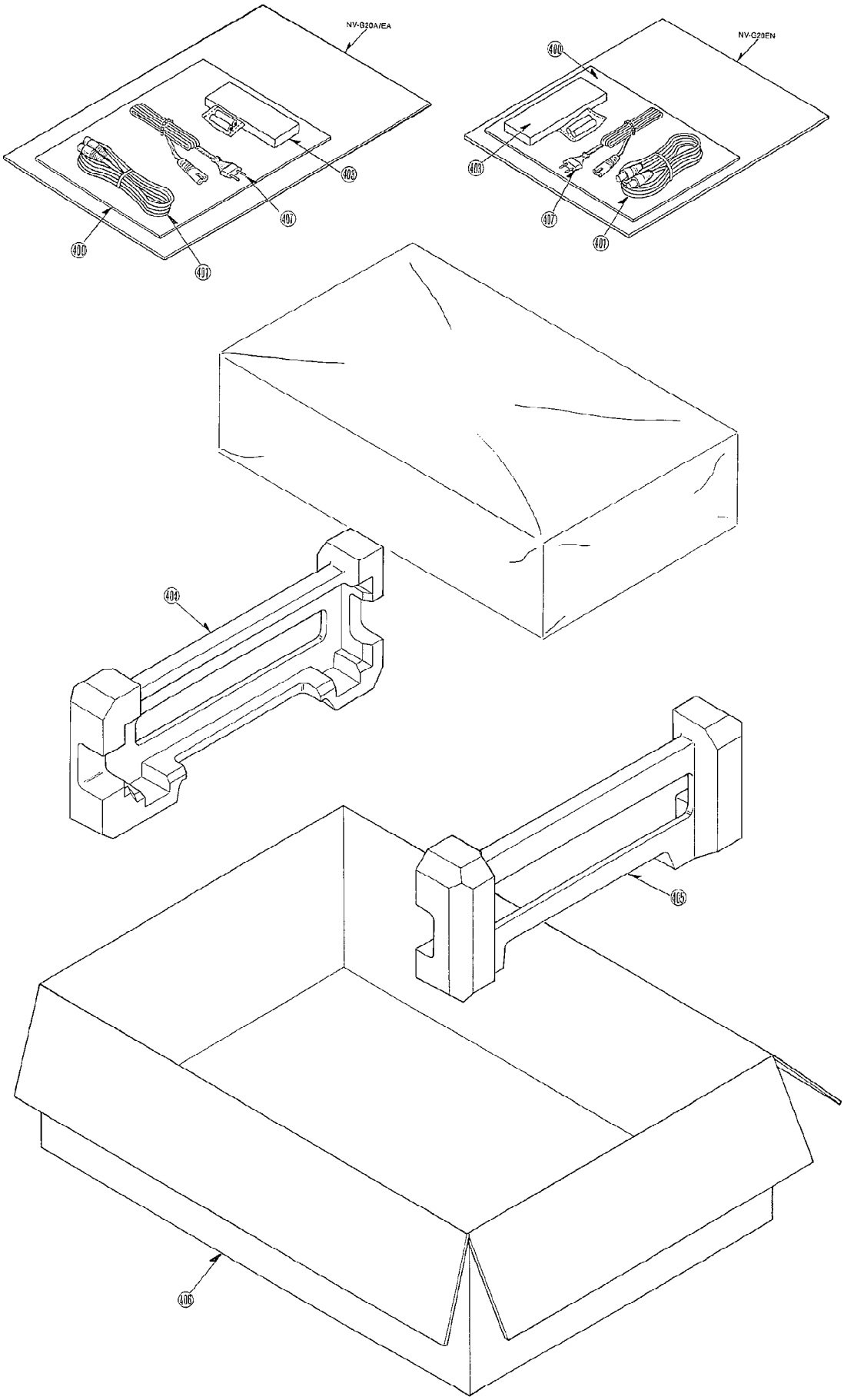
❸ CASSETTE UP MECHANISM SECTION



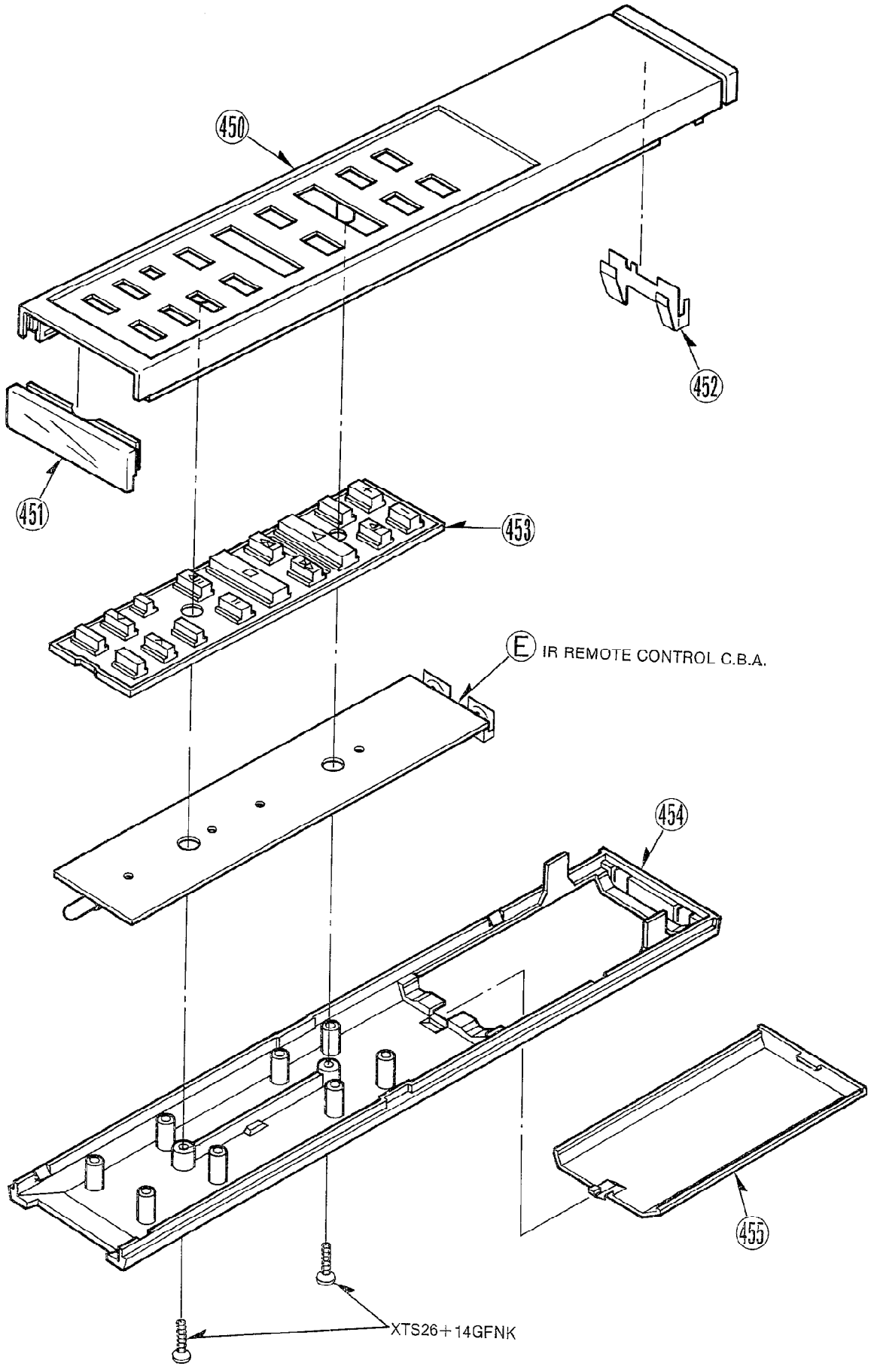
❹ CASING PARTS SECTION



❺ PACKING PARTS SECTION



❻ IR REMOTE CONTROL UNIT



ORDER NO. VRD8611148A
(Date of issue : NOV, 1986)

PARTS LIST

MODEL NO : NV-G20EN/A/EA

1. NV-G20EN/A/EA Mechanical Replacement Parts List

* This parts list is detachable from the manual.

Notes: 1. "Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE: ⚠ = <!>
Components identified with the mark <!> have the special characteristics for safety.
When replacing any of these components, use only the same type.
3. "<R>" in Remarks column indicates Recommended Parts.

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
1(1)		VHDO268	HEAD AMP SET SCREW	3	
2(1)		VMA6897	HEAD AMP MOUNT ANGLE (L)	1	
3(1)		VMA6898	HEAD AMP MOUNT ANGLE (R)	1	
4(1)		VEK3185	DEW SENSOR UNIT	1	
5(1)		VXA2702	EARTH PLATE UNIT	1	
6(1)		VEG0479	CYLINDER UNIT	1	<!>
7(1)		VEH0343	UPPER CYLINDER UNIT	1	
9(1)		VXA2703	MAIN HOLDER UNIT	1	
10(1)		VSC1806	CYLINDER C.B.A SHIELD PLATE	1	
11(1)		VXL1495	TENSION ARM (1) UNIT	1	
12(1)		VMB1563	TENSION SPRING	1	
13(1)		VX20225	TENSION BAND UNIT	1	
14(1)		VXR0145	SUPPLY REEL TABLE UNIT	1	
15(1)		VMX1171	REEL WASHER	2	
16(1)		VXL1496	TENSION RELEASE ARM(A)UNIT	1	
17(1)		VBS0038	FE HEAD	1	
18(1)		VXA2705	TENSION ARM BASE (1) UNIT	1	
19(1)		VMA6895	MOUNT ANGLE (L)	1	
20(1)		VMX1079	CUT WASHER	5	
21(1)		VXL1497	TENSION RELEASE ARM(B)UNIT	1	
22(1)		VMB1582	TENSION RELEASE SPRING	1	
23(1)		VES0350	SAFETY SW	1	
24(1)		VX20229	SUPPLY MAIN BRAKE UNIT	1	
25(1)		VX20228	SUPPLY SOFT BRAKE(1)UNIT	1	
26(1)		VMB1564	SUPPLY SOFT BRAKE SPRING	1	
27(1)		VX20231	TAKE UP MAIN BRAKE UNIT	1	
28(1)		VX20221	TAKE UP SOFT BRAKE UNIT	1	
29(1)		VMB1561	TAKE UP SOFT BRAKE SPRING	1	
30(1)		VMA6896	MOUNT ANGLE (R)	1	
31(1)		VHDO322	ADJUST SCREW	1	
32(1)		VMB1251	ADJUST SPRING	1	
33(1)		VHDO089B	AZIMUTH ADJUST SCREW	1	
34(1)		VBR0112	A/C HEAD	1	
35(1)		VHNO063	M4 NYLON NUT	1	
36(1)		VHNO050	ADJUST NUT	1	
37(1)		VXA2675	HEAD BASE UNIT	1	
38(1)		VMB1567	A/C HEAD SPRING	1	
39(1)		VXL1480	SUB LOADING ARM (1) UNIT	1	
40(1)		VMB1566	SUB POST SPRING	1	
41(1)		VXQ0005	THRUST SCREW UNIT	1	
42(1)		VHDO317	HOUSING SCREW	3	
43(1)		VMX1033	OIL SEAL	2	
44(1)		VMX1078	PINCH CAM CAP	1	
45(1)		VXL1481	PRESSURE ROLLER UNIT	1	
46(1)		VMB1568	PIN PRESSURE SPRING	1	
47(1)		VML1873	PINCH PRESSURE ARM	1	
48(1)		VMB1569	PINCH PRESSURE ARM RELEASE SPRING	1	
49(1)		VML1874	PINCH LIFT ARM	1	
50(1)		VDG0357	P5 PULL OUT SECTOR GEAR	1	
51(1)		VDG0356	PINCH CAM	1	
52(1)		VHNO023	M3 NYLON NUT	1	
53(1)		VXL1485	P5 UNIT	1	
54(1)		VMB1554	P5 SPRING	1	
55(1)		VSS0175A	MODE SW	1	
56(1)		VSC1851	SHIELD PLATE	1	
57(1)		VXP0764B	ROLLER POST UNIT	1	
58(1)		VXA2729	INCLIND BASE (S)(1)UNIT	1	
59(1)		VHDO133	ROLLER POST SCREW	2	
60(1)		VMDO910	POST STOPPER	2	
61(1)		VXP0764A	ROLLER POST UNIT	1	
62(1)		VXA2686	INCLIND BASE(T)(1)UNIT	1	
63(1)		VXA2687	INCLIND ADJUST PLATE UNIT	1	
64(1)		VDG0334	PINCH SPEED DOWN GEAR	1	
65(1)		VDG0332	CONNECTION GEAR	1	
66(1)		VSJ0073	SOLENOID	1	
67(1)		VXA2692	KICK ROD UNIT	1	
68(1)		VXA2691	SOLENOID LEVER (1) UNIT	1	
69(1)		VMB1553	KICK ROD SPRING	1	
70(1)		VMB1565	MAIN BRAKE SPRING	1	
71(1)		VXR0146	TAKE UP REEL TABLE UNIT	1	
72(1)		VXD0101	HOUSING UNIT	1	
73(1)		VHDO342	CYLINDER UNIT MOUNT SCREW	3	
74(1)		VSC1843	HEAT SINK PLATE	1	
100(2)		VMX1079	CUT WASHER	8	
101(2)		VMB1583	TAKE UP SOFT BRAKE RELEASE ARM SPRING	1	
102(2)		VMB1560	MAIN LEVER SPRING	1	
103(2)		VXA2701	MAIN LEVER (1) UNIT	1	
104(2)		VMM0160	SUB LEVER	1	
105(2)		VXL1500	SS BRAKE ARM UNIT	1	
106(2)		VMB1588	SS BRAKE SPRING	1	
107(2)		VXA2707	SS BRAKE BASE (1) UNIT	1	
108(2)		VXA2674	TENSION ROLLER UNIT	1	
109(2)		VXL1491	CAM FOLLOWER ARM UNIT	1	
110(2)		VML1861	DETENT ARM	1	
111(2)		VDG0346	MAIN CAM GEAR	1	
112(2)		VDG0343	SUB CAM GEAR	1	
113(2)		VDG0348	CENTRE GEAR	1	
114(2)		VDG0344	RETAINER GEAR	1	
115(2)		VDG0345	PLANET GEAR	2	
116(2)		VDG0349	CLUTCH DISK	1	
117(2)		VMB1558	CLUTCH SPRING	1	
118(2)		VDG0350	LOCK SLIDE GEAR	1	
119(2)		VDG0335	DRIVE DISK	1	
120(2)		VDG0342	RING GEAR	1	
121(2)		VMX0967	CUT WASHER	2	
122(2)		VML1859	CHANGE LEVER	1	
123(2)		VXA2672	RELEASE LEVER (1) UNIT	1	
124(2)		VMB1557	RELEASE SPRING	1	
125(2)		VML1860	RELEASE LEVER	1	
126(2)		VMX1124	REEL GEAR RING	2	
127(2)		VXP0779	TAKE UP REEL GEAR UNIT	1	
128(2)		VDG0337	SUPPLY REEL GEAR	1	
129(2)		VML1858	RETURN LEVER (R)	1	
130(2)		VML1857	RETURN LEVER (L)	1	
131(2)		VMD0913	STOPPER BASE	1	
132(2)		VDV0159	TIMING BELT	1	
133(2)		VXP0777	ROTOR UNIT	1	
134(2)		VMA6998	ROTOR STOPPER	1	
135(2)		VEK2944	STATOR UNIT	1	<!>
136(2)		VMA6847	SUB PLATE	1	
137(2)		VXP0767	CENTRE PULLEY UNIT	1	
138(2)		VDG0340	LOADING GEAR (T)	1	
139(2)		VMB1555	LOADING SPRING	2	
140(2)		VXL1489	LOADING ARM (T)(1) UNIT	1	
141(2)		VXA2673	SECTOR GEAR UNIT	1	
142(2)		VDG0347	LOADING CAM GEAR	1	
143(2)		VDG0339	LOADING GEAR (S)	1	
144(2)		VML1855	PLAY CONTROL ARM	1	
145(2)		VXL1487	LOADING ARM (S)(1) UNIT	1	
146(2)		VDG0336	INTERMEDIATE GEAR	1	
147(2)		VXL1490	PLAY ARM UNIT	1	
148(2)		VBK0048	FG HEAD	1	
201(3)		VMA6903	TOP PLATE	1	
202(3)		VXA2679	CASSETTE HOLDER UNIT	1	
203(3)		VMB1573	MOUNT LEVER SPRING	1	
204(3)		VMD0919	HOLDER GUIDE (L)	1	
205(3)		VMM0163	MOUNT LEVER	1	
206(3)		VDP1077	ROLLER	2	
207(3)		VML1883	PRESSURE LEVER (L)	1	
208(3)		VMA6902	HOLDER ANGLE	1	
209(3)		VMA6901	CASSETTE HOLDER	1	
210(3)		VML1882	OPENER LEVER	1	
211(3)		VML1884	PRESSURE LEVER (R)	1	
212(3)		VMB1584	OPENER LEVER SPRING	1	
213(3)		VMD0920	HOLDER GUIDE (R)	1	
214(3)		VMB1576	RELEASE SPRING	1	
215(3)		VML1881	RELEASE LEVER	1	
216(3)		VXA2676	SIDE PLATE (L) UNIT	1	
217(3)		MVD0917	SIDE PLATE (L)	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
218(3)		VML1880	OPENER LEVER	1	
219(3)		VXA2677	SIDE PLATE (R) UNIT	1	
220(3)		VMD0918	SIDE PLATE (R)	1	
221(3)		VSS0176	SLIDE SW	1	
222(3)		VML1886	DOWN SUPPORT LEVER	1	
223(3)		VMB1575	DOWN SUPPORT SPRING	1	
224(3)		VXA2695	RACK (A)(1) UNIT	1	
225(3)		VMB1572	CLUTCH SPRING	1	
226(3)		VMB1574	LOCK SPRING	1	
227(3)		VML1885	LOCK LEVER	1	
228(3)		VXA2829	RACK (B) UNIT	1	
229(3)		VXP0851	MAIN SHAFT UNIT	1	
230(3)		VMB1570	SUB WIPER SPRING (L)	1	
231(3)		VML1878	SUB WIPER ARM	1	
232(3)		VML1879	SUB WIPER ARM (R)	1	
233(3)		VMB1571	SUB WIPER SPRING (R)	1	
234(3)		VMA6900	CASSETTE GUIDE	1	
235(3)		VKF0848	BLINDER PANEL	1	
236(3)		VMB1258	BLINDER SPRING	1	
237(3)		VMB1650	RACK (C) SPRING	1	
238(3)		VMA7062	CONNECTION ROD	1	
239(3)		VMB1686	CONNECTION ROD	1	
300(4)		VGM0202	TOP PANEL UNIT	1	BLACK
300(4)		VGM0228	TOP PANEL UNIT	1	SILVER
301(4)		VHD0304	TOP PANEL SCREW	2	BLACK
301(4)		VHD0305	TOP PANEL SCREW	2	SILVER
313(4)		VGH1127	POWER NAME PLATE	1	
314(4)		VSC1827	SHIELD CASE (L)	1	
315(4)		VMZ0916	BARRIER (B)	1	<!>
316(4)		VME0902	BARRIER (A)	1	<!>
317(4)		VMZ0948	BARRIER (E)	1	<!>
318(4)		VSC1830	HEAT SINK	1	
319(4)		VSC1924	SHIELD CASE MAIN	1	
320(4)		VMZ0876	INSULATION SHEET	2	<!>
321(4)		VGQ1109	IR. HOLDER	1	
322(4)		VMZ0917	BARRIER (C)	1	<!>
323(4)		VMZ0918	BARRIER (D)	1	<!>
324(4)		VSC1829	SHIELD CASE (R)	1	
326(4)		VMP1038	TOP HOLDER ANGLE (R)	1	
327(4)		VMP1037	TOP HOLDER ANGLE (L)	1	
328(4)		VKA0026	RUBBER FOOT	2	
329(4)		VJF0285	WIRE SUDDLE	2	
334(4)		VYP1806	FRONT PANEL UNIT	1	BLACK
334(4)		VYP1807	FRONT PANEL UNIT	1	SILVER
335(4)		VYF0972	FRONT DOOR UNIT	1	BLACK
335(4)		VYF0973	FRONT DOOR UNIT	1	SILVER
336(4)		VKU0245	BOTTOM PLATE	1	
337(4)		VHD0059	BOTTOM SCREW	5	
338(4)		VHD0268	SCREW	3	
339(4)		VJR3	CLAMPER	1	NV-H65EG,EV
341(4)		VGU3531	CH BUTTON	6	
342(4)		VGQ0550	LATCH	1	
343(4)		VMC0258	EARTH SPRING	1	
344(4)		VMP1058	FRAME ANGLE	1	
400(5)		VQT2093	OPERATING INSTRUCTIONS	1	NV-G20EN(ENGLISH,
					CHINESE) <!>
400(5)		VQT2099	OPERATING INSTRUCTIONS	1	NV-G20EN(MALAY) <!>
400(5)		VQT2100	OPERATING INSTRUCTIONS	1	NV-G20A/EA
					(ENGLISH) <!>
401(5)		VJA0332	DIN RF CABLE	1	NV-G20EN
401(5)		VJA0376	DIN RF CABLE	1	NV-G20A/EA
403(5)		VEQ0507	REMOTE CONTROL UNIT	1	
404(5)		VPN1709	CUSHION (R)	1	
405(5)		VPN1710	CUSHION (L)	1	
406(5)		VPG3095	PACKING CASE	1	NV-G20EN(BLACK)
406(5)		VPG3096	PACKING CASE	1	NV-G20EN(SILVER)
406(5)		VPG3137	PACKING CASE	1	NV-G20A
406(5)		VPG3138	PACKING CASE	1	NV-G20EA
407(5)		VPN1156	HANDLE	1	NV-G20EN
408(5)		VJA0388	AC CORD	1	NV-G20EN <!>
408(5)		VJA0392	AC CORD	1	NV-G20A/EA <!>
450(6)		VYK1465	TOP CASE UNIT	1	
451(6)		VKW0617	SMOKE BOARD	1	
452(6)		VJR0185	ELECTRODE (COMMON)	1	
453(6)		VSP0242	RUBBER CONTACT	1	
454(6)		VKM0856	BOTTOM CASE	1	
455(6)		VKF0628	BATTERY COVER	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			JIG		
		VFJ8125H3F	VHS-ALIGNMENT TAPE(PAL)	1	
		VFK0335	RETAINING RING REMOVER	1	
			(3mm/4mm)		
		VFK0387	TENSION POST ADJUSTMENT	1	
			PLATE		
		VFK0191	POST ADJUSTMENT PLATE	1	
		VFK0190	REEL TABLE HEIGHT GAUGE	1	
		VFK0328	H-POSITION ADJ.	1	
			SCREWDRIVER		
		VFK0329	POST ADJUSTMENT SCREWDRIVER	1	
		VFK62	FAN TYPE TENSION GAUGE	1	
		VFK0326	HEX WRENCH SET	1	
		VFK0132	BACK TENSION METER	1	
		VFK0343	CHECK LIGHT	1	
		VFK0344	HEIGHT ADJUSTMENT JIG	1	
		VFK27	HEAD CLEANING STICK	1	
		MOR255	MORLYTONE GREASE	1	
		VFK0283	SERVICE ALIGNMENT TOOL KIT	1	
		VFK0341	UPPER CYLINDER REMOVER	1	

2. NV-G20EN/A/EA Electrical Replacement Parts List

Notes: 1. Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE: ⚠ = <!>
Components identified with the mark <!> have the special characteristics for safety.
When replacing any of these components, use only the same type.
3. Unless otherwise specified.
All resistors are in OHMS(Ω), K=1,000Ω, M=1,000KΩ. All capacitors are in MICROFARADS(μF), P=μμF.
4. C.B.A. or C.B. marked with "■" show below the main assembled parts.
5. When ordering parts, use part No. only from Part No. column.
6. "<R>" in Remarks column indicates Recommended Parts.

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VEP03395A	MAIN C.B.A.	1	INCLUDING THE SERVO
			(SYSTEM COMTROL,SERVO,		PACK C.B.A.
			LUMINANCE & CHROMINANCE,		(VEP02265A),SUB
			AUDIO,POWER,DEMODULATOR,		SERVO (1) PACK C.B.A
			TUNER)		(VEP02281A),SUB
					SERVO (2) PACK C.B.A
					(VEP02282A),
					LUMINANCE &
					CHROMINANCE PACK
					C.B.A.(VEP03381B),
					INPUT SELECT PACK
					C.B.A.(VEP03393A),
					TV DEMODULATOR PACK
					C.B.A.(VEP07348B),
					TUNER ARU PACK
					C.B.A.(VEP07349B)
					NV-G20EN<!><R>
		VEP03395B	MAIN C.B.A.	1	INCLUDING THE SERVO
			(SYSTEM COMTROL,SERVO,		PACK C.B.A.
			LUMINANCE & CHROMINANCE,		(VEP02266A),SUB
			AUDIO,POWER,DEMODULATOR,		SERVO (1) PACK C.B.A
			TUNER)		(VEP02281A),SUB
					SERVO (2) PACK C.B.A
					(VEP02282A),
					LUMINANCE &
					CHROMINANCE PACK
					C.B.A.(VEP03381B),
					INPUT SELECT PACK
					C.B.A.(VEP03393B),
					TV DEMODULATOR PACK
					C.B.A. (VEP07348C),
					TUNER ARU PACK
					C.B.A.(VEP07349C)
					NV-G20A<!><R>
		VEP03395C	MAIN C.B.A.	1	INCLUDING THE SERVO
			(SYSTEM COMTROL,SERVO,		PACK C.B.A.
			LUMINANCE & CHROMINANCE,		(VEP02266A),SUB
			AUDIO,POWER,DEMODULATOR,		SERVO (1) PACK C.B.A
			TUNER)		(VEP02281A),SUB
					SERVO (2) PACK C.B.A
					(VEP02282A),
					LUMINANCE &
					CHROMINANCE PACK
					C.B.A.(VEP03381B),
					INPUT SELECT PACK
					C.B.A.(VEP03393B),
					TV DEMODULATOR PACK
					C.B.A.(VEP07348B),
					TUNER ARU PACK
					C.B.A.(VEP07349B)
					NV-G20EA<!>
		VEP02266A	SERVO PACK C.B.A.	1	INCLUDING THE SUB
					SERVO (1) PACK C.B.A
					(VEP02281A), SUB
					SERVO (2) PACK C.B.A
					(VEP02282A) PART
					LIST IS INCLUDED IN
					MAIN C.B.A.
					(VEP03395A/B/C)
		VEP02281A	SUB SERVO (1) PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A(VEP03395A/B/C)

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VEP02282A	SUB SERVO (2) PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A(VEP03395A/B/C)
		VEP03381B	LUMINANCE & CHROMINANC	1	PART LIST IS
			PACK C.B.A.		INCLUDED IN MAIN
					C.B.A(VEP03395A/B/C)
		VEP05097E	HEAD AMP PACK C.B.A.	1	
		VEP03393A	INPUT SELECT PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A.(VEP03395A)
					NV-G20EN
		VEP03393B	INPUT SELECT PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A.(VEP03395B/C)
					NV-G20A/EA
		VEP06388A	OPERATION C.B.A.	1	
		VEP07370A	TIMER C.B.A.	1	
		VEP07348B	TV DEMODULATOR PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A.(VEP03395A/C)
					NV-G20EN/EA
		VEP07348C	TV DEMODULATOR PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A.(VEP03395B)
					NV-G20A
		VEP07349B	TUNER ARU PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A.(VEP03395A/C)
					INCLUDING THE RF
					CONVERTER UNIT
					(ENC87901),
					NV-G20EN/EA
		VEP07349C	TUNER ARU PACK C.B.A.	1	PART LIST IS
					INCLUDED IN MAIN
					C.B.A.(VEP03395B)
					INCLUDING THE RF
					CONVERTER UNIT
					(ENC87902),
					NV-G20A
		VEP01264B	POWER C.B.A.	1	NV-G20EN
		VEP01264C	POWER C.B.A.	1	NV-G20A
		VEP01264E	POWER C.B.A.	1	NV-G20EA
		VEP00H67A	SUB POWER C.B.A.	1	NV-G20EN
		VEP00H48A	SUB POWER,C.B.A.	1	NV-G20A/EA <R>
		ENC87901	RF CONVERTER	1	NV-G20EN/EA <!><R>
		VEQ0488	RF CONVERTER	1	NV-G20EN/EA <!><R>
		ENC87902	RF CONVERTER	1	NV-G20A <!><R>
		VEQ0489	RF CONVERTER	1	NV-G20A <!><R>
		VEP06380B	IR RECEIEVER C.B.A.	1	PART LIST IS
					INCLUDED IN
					OPERATION C.B.A.
					(VEP06388A)
		VEP22063B	REMOTE CONTROL	1	
			UNIT C.B.A.		

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VEP00H22A	CYLINDER DRIVE C.B.A.	1	
		VEP00H30A	MECHANISM CONNECTION C.B.A.	1	
		VEP00H31A	REEL SENSOR C.B.A.	1	
		VXA2689	LED C.B.A.	1	
		VEP00H34A	PHOTO TR(T) C.B.A.	1	
		VEP00H35A	PHOTO TR(S) C.B.A.	1	
	■	VEP03395A	MAIN C.B.A.		INCLUDING THE SERVO
			(SYSTEM COMTROL,SERVO,		PACK C.B.A.
			LUMINANCE & CHROMINANCE,		(VEP02266A),SUB
			AUDIO,POWER,DEMODULATOR,		SERVO (1) PACK C.B.A
			TUNER)		(VEP02281A),SUB
					SERVO (2) PACK C.B.A
					(VEP02282A),
					LUMINANCE &
					CHROMINANCE PACK
					C.B.A.(VEP03381B),
					INPUT SELECT PACK
					C.B.A.(VEP03393A),
					TV DEMODULATOR PACK
					C.B.A.(VEP07348B),
					TUNER ARU PACK
					C.B.A.(VEP07349B)
					NV-G20EN(!)(R)
	■	VEP03395B	MAIN C.B.A.		INCLUDING THE SERVO
			(SYSTEM COMTROL,SERVO,		PACK C.B.A.
			LUMINANCE & CHROMINANCE,		(VEP02266A),SUB
			AUDIO,POWER,DEMODULATOR,		SERVO (1) PACK C.B.A
			TUNER)		(VEP02281A),SUB
					SERVO (2) PACK C.B.A
					(VEP02282A),
					LUMINANCE &
					CHROMINANCE PACK
					C.B.A.(VEP03381B),
					INPUT SELECT PACK
					C.B.A.(VEP03393B),
					TV DEMODULATOR PACK
					C.B.A. (VEP07348C),
					TUNER ARU PACK
					C.B.A.(VEP07349C)
					NV-G20A(!)(R)
	■	VEP03395C	MAIN C.B.A.		INCLUDING THE SERVO
			(SYSTEM COMTROL,SERVO,		PACK C.B.A.
			LUMINANCE & CHROMINANCE,		(VEP02266A),SUB
			AUDIO,POWER,DEMODULATOR,		SERVO (1) PACK C.B.A
			TUNER)		(VEP02281A),SUB
					SERVO (2) PACK C.B.A
					(VEP02282A),
					LUMINANCE &
					CHROMINANCE PACK
					C.B.A.(VEP03381B),
					INPUT SELECT PACK
					C.B.A.(VEP03393B),
					TV DEMODULATOR PACK
					C.B.A.(VEP07348B),
					TUNER ARU PACK
					C.B.A.(VEP07349B)
					NV-G20EA(!)
			CAPACITORS		
C202		ECEA1HKR47	ELECTROLYTIC 50V 0.47U	1	
C203		ECUX1H562KBN	CHIP 50V 5600P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C204		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C205		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C206		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C207		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C208		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C209		ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C210		ECEA0JK330	ELECTROLYTIC 6.3V 33U	1	
C212		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C213		ECQV1H683JZ	MYLAR 50V 0.068U	1	
C214		ECUX1H102KBN	CHIP 50V 1000P	1	
C215		ECEA1HKNR33	ELECTROLYTIC 50V 0.33U	1	
C216		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C217		ECEA1HKR47	ELECTROLYTIC 50V 0.47U	1	
C218		ECUX1H472KBN	CHIP 50V 4700P	1	
C219		ECQV1H334JZ	MYLAR 50V 0.33U	1	
C220		ECUX1H1032FN	CHIP 50V 0.01U	1	
C221		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C222		ECQB1H562JH	MYLAR 50V 5600P	1	
C223		ECQB1H223JH	MYLAR 50V 0.022U	1	
C224		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C225		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C226		ECUX1H102KBN	CHIP 50V 1000P	1	
C227		ECUX1H332KBN	CHIP 50V 3300P	1	
C229		ECQB1H272JH	MYLAR 50V 4700P	1	
C230		ECEA1CKN100	ELECTROLYTIC 16V 10U	1	
C231		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C232		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C234		ECUX1H102KBN	CHIP 50V 1000P	1	
C236		ECQB1H223JH	MYLAR 50V 0.022U	1	
C237		ECQB1H562JH	MYLAR 50V 5600P	1	
C238		ECEA0JK101	ELECTROLYTIC 6.3V 100U	1	
C239		ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C240		ECEA1621O	ELECTROLYTIC 16V 10U	1	
C241		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C242		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C243		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C244		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C245		ECUX1H562KBN	CHIP 50V 5600P	1	
C246		ECQV1H104JZ	MYLAR 50V 0.1U	1	
C247		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C248		ECUX1H102KBN	CHIP 50V 1000P	1	
C249		ECCF1H101JC	CERAMIC 50V 100P	1	
C250		ECCF1H271JC	CERAMIC 50V 270P	1	
C251		ECCF1H180JC	CERAMIC 50V 18P	1	
C252		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C253		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
C254		VCYD1C473MR1	SEMICONDUCTOR 16V 0.047U	1	
C255		ECKF1H332KB	CERAMIC 50V 3300P	1	
C271		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C272		ECEA1EK3R3	ELECTROLYTIC 25V 3.3U	1	
C273		ECQB1H103JH	MYLAR 50V 0.01U	1	
C301		ECUX1H271KBN	CHIP 50V 270P	1	
C302		ECEA0JU331	ELECTROLYTIC 6.3V 330U	1	
C303		ECUX1H1032FN	CHIP 50V 0.01U	1	
C304		ECUX1H1032FN	CHIP 50V 0.01U	1	
C305		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C306		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C307		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C309		ECUX1H560JCN	CHIP 50V 56P	1	
C310		ECUX1H820JCN	CHIP 50V 82P	1	
C311		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C312		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C313		ECUX1H100DCN	CHIP 50V 10P	1	
C314		ECEA1EK4R7	ELECTROLYTIC 25V 4.7U	1	
C315		ECEA1EKN2R2	ELECTROLYTIC 25V 2.2U	1	
C316		ECUX1H180JCN	CHIP 50V 18P	1	
C317		ECUX1H180JCN	CHIP 50V 18P	1	
C318		ECUX1H180JCN	CHIP 50V 18P	1	
C319		ECUX1H180JCN	CHIP 50V 18P	1	
C321		ECUX1H040CCN	CHIP 50V 4P	1	
C322		VCYD1C104MR1	SEMICONDUCTOR 16V 0.1U	1	
C323		ECUX1H120JCN	CHIP 50V 12P	1	
C325		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C326		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C328		ECEA1HK0R1	ELECTROLYTIC 50V 0.1U	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
C330	ECUX1H220JCN	CHIP 50V 22P	1	
C331	ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C332	ECUX1H680JCN	CHIP 50V 68P	1	
C333	ECUX1H151JCN	CHIP 50V 150P	1	
C334	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C335	ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C336	ECUX1H470JCN	CHIP 50V 47P	1	
C337	ECUX1H100DCN	CHIP 50V 10P	1	
C701	ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C702	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C703	ECEA1HKN2R2	ELECTROLYTIC 50V 2.2U	1	
C705	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C706	ECQV1H823JZ	MYLAR 50V 0.082U	1	
C707	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C708	ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C709	ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C710	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C715	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C716	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C717	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C718	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C719	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C720	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C721	ECEA1HKR27	ELECTROLYTIC 50V 0.27U	1	
C722	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C723	ECUX1H120JCN	CHIP 50V 12P	1	
C725	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C728	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C730	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C731	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C732	ECQV1H224JZ	MYLAR 50V 0.22U	1	
C734	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C735	ECUX1H070DCN	CHIP 50V 7P	1	
C736	ECQB1H103JH	MYLAR 50V 0.01U	1	
C737	ECUX1H151JC	CHIP 50V 150P	1	
C739	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C740	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C741	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C742	ECUX1H030DCN	CHIP 50V 3P	1	
C743	ECUX1H270JSN	CHIP 50V 27P	1	NV-G20EN/EA
C743	ECUX1H270JRN	CHIP 50V 27P	1	NV-G20A
C744	ECEA1HKR47	ELECTROLYTIC 50V 0.47U	1	
C745	ECUX1H680JPN	CHIP 50V 68P	1	NV-G20EN/EA
C745	ECUX1H680JRN	CHIP 50V 68P	1	NV-G20A
C746	ECUX1H150JC	CHIP 50V 15P	1	
C747	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C748	ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C749	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C760	ECQV1H473JZ	MYLAR 50V 0.047U	1	
C781	ECUX1H390JPN	CHIP 50V 39P	1	
C801	ECUX1H391KBN	CHIP 50V 390P	1	
C802	ECQB1H223JH	MYLAR 50V 0.022U	1	
C803	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C804	ECUX1H270JCN	CHIP 50V 27P	1	
C805	ECUX1H471KBN	CHIP 50V 470P	1	
C806	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C807	ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C808	ECEA1CZ100	ELECTROLYTIC 10V 100U	1	
C809	ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C810	ECUX1H050CCN	CHIP 50V 5P	1	
C811	ECUX1H102KBN	CHIP 50V 1000P	1	
C812	ECEA1AK470	ELECTROLYTIC 10V 47U	1	
C813	ECQV1H154JZ	MYLAR 50V 0.15U	1	
C814	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C815	ECUX1H471KBN	CHIP 50V 470P	1	
C816	ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C817	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C818	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C819	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C820	VCYD1C104MR1	SEMICONDUCTOR 16V 0.1U	1	
C821	VCYD1C104MR1	SEMICONDUCTOR 16V 0.1U	1	
C822	ECQV1H473JZ	MYLAR 50V 0.047U	1	
C823	ECQV1H473JZ	MYLAR 50V 0.047U	1	
C824	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C825	ECUX1H103ZFN	CHIP 50V 0.01U	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
C826	ECUX1H820JCN	CHIP 50V 82P	1	
C827	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C2001	ECQB1H333JH	MYLAR 50V 0.033U	1	
C2002	ECQB1H333JH	MYLAR 50V 0.033U	1	
C2003	ECQB1H333JH	MYLAR 50V 0.033U	1	
C2004	ECEA1HKZR2	ELECTROLYTIC 50V 2.2U	1	
C2005	ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C2006	ECEA1HK2R2	ELECTROLYTIC 50V 2.2U	1	
C2007	ECQB1H223JH	MYLAR 50V 0.022U	1	
C2008	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2011	ECEA1CK101	ELECTROLYTIC 16V 100U	1	
C2012	ECUX1H332KBN	CHIP 50V 3300P	1	
C2013	ECUX1H332KBN	CHIP 50V 3300P	1	
C2014	ECUX1H332KBN	CHIP 50V 3300P	1	
C2016	ECEA25247	ELECTROLYTIC 25V 47U	1	
C2017	ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C2018	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2019	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2020	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C2021	ECQB1H223JH	MYLAR 50V 0.022U	1	
C2022	ECQV1H274JZ	MYLAR 50V 0.27U	1	
C2023	ECQV1H474JZ	MYLAR 50V 0.47U	1	
C2701	ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C2702	ECQV1H224JZ	MYLAR 50V 0.22U	1	
C3001	ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C3002	ECEA0JU471	ELECTROLYTIC 6.3V 470U	1	
C3003	ECUX1H220JCN	CHIP 50V 22P	1	
C3004	ECUX1H151JCN	CHIP 50V 150P	1	
C3005	ECUX1H681JN	CHIP 50V 680P	1	
C3006	ECUX1H220JCN	CHIP 50V 22P	1	
C3007	ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C3008	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C3012	ECUX1H150JCN	CHIP 50V 15P	1	
C3013	ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C3501	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C3502	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C3503	VCYD1E332KR	SEMICONDUCTOR 25V 3300P	1	
C3504	VCYD1E332KR	SEMICONDUCTOR 25V 3300P	1	
C3505	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4002	ECUX1H102KBN	CHIP 50V 1000P	1	
C4003	ECEA1CK330	ELECTROLYTIC 16V 33U	1	
C4004	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4005	ECEA1AK330	ELECTROLYTIC 10V 33U	1	
C4006	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4007	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4008	ECUX1H471KBN	CHIP 50V 470P	1	
C4009	ECUX1H101KN	CHIP 50V 100P	1	
C4010	ECQB1H123JH	MYLAR 50V 0.012U	1	
C4011	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4012	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C4013	ECEA1AK220	ELECTROLYTIC 10V 22U	1	
C4014	ECEA1AK101	ELECTROLYTIC 10V 100U	1	
C4015	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4016	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4018	ECQB1H223JH	MYLAR 50V 0.022U	1	
C4019	ECQB1H333KI	MYLAR 50V 0.033U	1	
C4020	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C4021	ECUX1H102KBN	CHIP 50V 1000P	1	
C4022	ECQB1H103JH	MYLAR 50V 0.01U	1	
C4023	ECEA1CK470	ELECTROLYTIC 16V 47U	1	
C4024	ECQP1222JZ	MYLAR 100V 2200P	1	
C4025	ECEA1CKL100	ELECTROLYTIC 16V 10U	1	
C4026	ECCD2H121K	CERAMIC 500V 120P	1	
C6001	ECEA0JK220	ELECTROLYTIC 6.3V 22U	1	
C6007	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C6011	ECUX1H103KBN	CHIP 50V 0.01U	1	
C6012	ECUX1H103KBN	CHIP 50V 0.01U	1	
C6014	ECUX1H221KN	CHIP 50V 220P	1	
C6017	ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6018	ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6019	ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6020	ECUX1H103KBN	CHIP 50V 0.01U	1	
C6022	ECEA0JK330	ELECTROLYTIC 6.3V 33U	1	
C6023	ECUX1H103KBN	CHIP 50V 0.01U	1	
C6024	ECEA1CK330	ELECTROLYTIC 16V 33U	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
C6025	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C6026	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C6027	ECUX1H271KBN	CHIP 50V 270P	1	
C6028	ECUX1H271KBN	CHIP 50V 270P	1	
C6029	ECUX1H271KBN	CHIP 50V 270P	1	
C7518	EECF5R5U105	GOLD 5.5V 1	1	
C7551	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C7552	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C7553	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C7554	ECEA1VK220	ELECTROLYTIC 35V 220U	1	
C7555	ECQB1H273KH	MYLAR 50V 0.027U	1	
C7556	ECQV1H823JZ	MYLAR 50V 0.082U	1	
C7557	ECQV1H683JZ	MYLAR 50V 0.068U	1	
C7558	ECUX1H103KBN	CHIP 50V 0.01U	1	
C7559	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C7560	ECUX1H103KBN	CHIP 50V 0.01U	1	
C7561	ECQV1H104JZ	MYLAR 50V 0.1U	1	
C7563	ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C7564	ECEA1CK220	ELECTROLYTIC 16V 22U	1	
C7565	ECUX1H103KBN	CHIP 50V 0.01U	1	
C7566	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C7567	ECEA1HKN010	ELECTROLYTIC 50V 1U	1	
C7568	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C7570	ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C7571	ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C8001	ECUX1H103ZFN	CHIP 50V 0.01U	1	
C8002	ECUX1H103ZFN	CHIP 50V 0.01U	1	
		DIODES		
D201	MA165	DIODE	1	
D202	MA165	DIODE	1	
D203	MA165	DIODE	1	
D204	MA156	DIODE	1	
D301	MA165	DIODE	1	
D302	MA165	DIODE	1	
D303	1SS283	DIODE	1	
D304	1SS283	DIODE	1	
D710	MA3100L	ZENER	1	
D712	MA27WA	DIODE	1	
D801	MA165	DIODE	1	
D802	MA165	DIODE	1	
D2007	MA165	DIODE	1	
D3001	MA165	DIODE	1	
D3002	MA165	DIODE	1	
D3004	ERA15-01	DIODE	1	
D3005	MA165	DIODE	1	
D3501	MA165	DIODE	1	
D6001	11ES1	DIODE	1	
D6002	MA165	DIODE	1	
D6005	MA165	DIODE	1	
D6009	MA165	DIODE	1	
D6010	MA165	DIODE	1	
D6011	MA165	DIODE	1	
D6012	MA165	DIODE	1	
D6017	11ES1	DIODE	1	
D6019	MA4140M	DIODE	1	
D6020	MA4110L	ZENER	1	
D6021	MA165	DIODE	1	
D6022	MA165	DIODE	1	
D6023	MA165	DIODE	1	
D6024	MA165	DIODE	1	
D6028	MA165	DIODE	1	
D6029	MA165	DIODE	1	
D6030	MA165	DIODE	1	
D6031	MA165	DIODE	1	
D7551	MA165	DIODE	1	
D7552	11ES1	DIODE	1	
D7553	MA165	DIODE	1	
D7555	MA27WB	DIODE	1	
D7574	LN28WPVT	LED	1	
		DELAY LINE		

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
DL301	EFDEN645A51F	DELAY LINE	1	
DL801	EFDHR124A13A	DELAY LINE	1	
		FILTERS		
FL301	ELB4M022	FILTER	1	
FL303	VLFO499	FILTER	1	
FL801	VLFO299	FILTER	1	
FL3501	VLFO413	FILTER	1	
FL4001	VLFO332	FILTER	1	
		INTEGRATED CIRCUITS		
IC201	UPD6160CA605	IC	1	
IC202	MN15311VJC	IC	1	
IC203	UPC358C	IC	1	<R>
IC301	VEFY017	FIC	1	
IC701	M51366SP	IC	1	
IC801	VEFC013	FIC	1	<R>
IC2001	BA6430S	IC	1	
IC2702	UPC358C	IC	1	<R>
IC3501	BA7004	IC	1	<R>
IC4001	RA7752IS	IC	1	
IC6001	MN15362WJR	IC	1	
IC6002	UPC393C	IC	1	<R>
IC6003	UPD4510BC	IC	1	<R>
IC6004	MN1280	IC	1	<R>
IC7551	AN5034	IC	1	<R>
		COILS		
L202	VLQEL05F101K	COIL 100UH	1	
L301	VLQEL05F180K	COIL 18UH	1	
L302	VLQEL05F180K	COIL 18UH	1	
L303	VLQEL05F101K	COIL 100UH	1	
L304	VLQEL05F101K	COIL 100UH	1	
L305	VLQEL05F101K	COIL 100UH	1	
L306	VLQEL05F820K	COIL 82UH	1	
L307	VLQEL05F101K	COIL 100UH	1	
L310	VLQEL05F101K	COIL 100UH	1	
L311	VLQEL05F270K	COIL 27UH	1	
L701	VLQEL05F680K	COIL 68UH	1	
L702	VLQEL05F680K	COIL 68UH	1	
L712	ELQTR82XB	COIL 0.82UH	1	
L713	ELQTR68XB	COIL 0.68UH	1	NV-G20EN/EA
L713	ELQTR56XB	COIL 0.56UH	1	NV-G20A
L714	ELQT1R2KB	COIL 1.2UH	1	
L715	VLQ0213K680T	COIL 68UH	1	
L717	VLQEL05F680K	COIL 68UH	1	
L718	VLQEL05F680K	COIL 68UH	1	
L719	VLQEL05F120K	COIL 12UH	1	
L781	VLQEL05F680K	COIL 68UH	1	
L801	VLQEL05F150K	COIL 15UH	1	
L802	VLQEL05F470K	COIL 47UH	1	
L803	VLQEL05F270K	COIL 27UH	1	
L804	VLQEL05F151K	COIL 150UH	1	
L805	VLQEL05F101K	COIL 100UH	1	
L806	VLQEL05F470K	COIL 47UH	1	
L807	VLQEL05F331K	COIL 330UH	1	
L808	VLQEL05F681K	COIL 680UH	1	
L809	VLQEL05F681K	COIL 680UH	1	
L810	VLQEL05F101K	COIL 100UH	1	
L2001	VLQEL05F102K	COIL 1000UH	1	
L3001	VLQEL05F101K	COIL 100UH	1	
L3002	VLQEL05F101K	COIL 100UH	1	
L3003	VLQEL05F101K	COIL 100UH	1	
L3004	VLQEL05F6R8J	COIL 0.8U	1	
L3005	VLQEL05F120J	COIL 1.2U	1	
L3501	VLQEL05F101K	COIL 100UH	1	
L3502	VLQEL05F101K	COIL 100UH	1	
L4001	VLQEL07F822J	COIL 8200UH	1	
L4002	VLQEL05F471K	COIL 470UH	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
L7551	VLQEL05F102K	COIL 1000UH	1	
L7552	VLQEL05F101K	COIL 100UH	1	
		CONNECTORS		
P001	VJS1232T		1	
P501	VJS1235T		1	
P502	VJS1233T		1	
P1504	VJS1745		1	
P2002	VJP1932T		1	
P4001	VJP1233T	CONNECTOR(MALE) 6P	1	
P6002	VJS1935		1	
P6004	VJS1467	CONNECTOR(FEMALE)	1	
P6005	VJS1917		1	
P6201	VJS1236T		1	
		TRANSISTORS		
Q201	2SD636	TRANSISTOR	1	<R>
Q202	2SD636	TRANSISTOR	1	<R>
Q203	2SB641	TRANSISTOR	1	<R>
Q204	2SB641	TRANSISTOR	1	<R>
Q205	2SB641	TRANSISTOR	1	<R>
Q206	2SB641	TRANSISTOR	1	<R>
Q207	2SC2206	TRANSISTOR	1	(B,C) <R>
Q208	2SD636	TRANSISTOR	1	<R>
Q271	2SD636	TRANSISTOR	1	<R>
Q272	2SD636	TRANSISTOR	1	<R>
Q273	2SD636	TRANSISTOR	1	<R>
Q274	2SD636	TRANSISTOR	1	<R>
Q301	2SD601	TRANSISTOR CHIP	1	<R>
Q302	2SB709	TRANSISTOR CHIP	1	<R>
Q303	2SB709	TRANSISTOR CHIP	1	<R>
Q304	2SD601	TRANSISTOR CHIP	1	<R>
Q305	2SB709	TRANSISTOR CHIP	1	<R>
Q306	2SD601	TRANSISTOR CHIP	1	<R>
Q307	2SC2295	TRANSISTOR	1	
Q308	2SB709	TRANSISTOR CHIP	1	<R>
Q703	2SD601	TRANSISTOR	1	(S,T)
Q710	2SC2377	TRANSISTOR	1	(C) <R>
Q712	2SC1317	TRANSISTOR	1	<R>
Q713	2SD1328	TRANSISTOR CHIP	1	(S,T) <R>
Q714	2SD601	TRANSISTOR CHIP	1	<R>
Q801	2SC2295	TRANSISTOR	1	
Q802	2SD601	TRANSISTOR CHIP	1	<R>
Q803	2SD601	TRANSISTOR CHIP	1	<R>
Q804	2SC2295	TRANSISTOR	1	
Q805	2SD601	TRANSISTOR CHIP	1	<R>
Q806	2SC2295	TRANSISTOR	1	
Q2001	2SB641	TRANSISTOR	1	<R>
Q2002	2SD636	TRANSISTOR	1	<R>
Q3001	2SB641	TRANSISTOR	1	<R>
Q3002	2SB641	TRANSISTOR	1	<R>
Q3003	2SC2206	TRANSISTOR	1	<R>
Q3501	2SC2206	TRANSISTOR	1	<R>
Q4001	2SD639	TRANSISTOR	1	(R) <R>
Q4002	2SD637	TRANSISTOR	1	<R>
Q4003	2SD637	TRANSISTOR	1	<R>
Q4004	2SB642	TRANSISTOR	1	(Q,R,S) <R>
Q6006	2SB643	TRANSISTOR	1	<R>
Q6007	2SB790	TRANSISTOR	1	(Q,R,S) <R>
Q6009	2SB790	TRANSISTOR	1	(Q,R,S) <R>
Q6016	2SD1275	TRANSISTOR	1	<R>
Q6017	2SD893	TRANSISTOR	1	(Q,R,S)
Q6018	2SD973	TRANSISTOR	1	<R>
Q6019	2SD638	TRANSISTOR	1	<R>
Q7551	2SB644	TRANSISTOR	1	<R>
Q7552	2SB644	TRANSISTOR	1	<R>
Q8001	2SD636	TRANSISTOR	1	<R>

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
		COMBINATION PARTS		
		(TRANSISTOR & RESISTORS)		
QR201	UN1113	TRANSISTOR-RESISTOR	1	<R>
QR202	UN1113	TRANSISTOR-RESISTOR	1	<R>
QR203	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR301	UN2213	TRANSISTOR-RESISTOR	1	<R>
QR701	UN2213	TRANSISTOR-RESISTOR	1	<R>
QR702	UN2213	TRANSISTOR-RESISTOR	1	<R>
QR711	UN2212	TRANSISTOR-RESISTOR	1	<R>
QR712	UN2212	TRANSISTOR-RESISTOR	1	<R>
QR713	UN2211	TRANSISTOR-RESISTOR	1	<R>
QR2002	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR2003	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR3001	UN1111	TRANSISTOR-RESISTOR	1	<R>
QR3003	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR3004	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6001	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR6004	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6005	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6006	UN1111	TRANSISTOR-RESISTOR	1	<R>
QR6008	UN1111	TRANSISTOR-RESISTOR	1	<R>
QR6011	UN1212	TRANSISTOR-RESISTOR	1	<R>
QR6012	DTA144EA	TRANSISTOR RESISTOR	1	<R>
QR6013	UN1213	TRANSISTOR-RESISTOR	1	<R>
QR6014	UN1211	TRANSISTOR-RESISTOR	1	<R>
		RESISTORS		
R201	ERJ6GMYJ393	CHIP 1/16W 39K	1	
R202	ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R203	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R204	ERJ6GMYJ221	CHIP 1/16W 220	1	
R205	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R206	ERJ6GMYJ392	CHIP 1/16W 3.9K	1	
R207	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R208	ERJ6GMYJ222	CHIP 1/16W 2.2K	1	
R209	ERJ6GMYJ682	CHIP 1/16W 6.8K	1	
R210	ERJ6GMYJ274	CHIP 1/16W 270K	1	
R211	ERJ6GMYJ563	CHIP 1/16W 56K	1	
R212	ERJ6GMYJ154	CHIP 1/16W 150K	1	
R213	ERJ6GMYJ154	CHIP 1/16W 150K	1	
R214	ERJ6GMYJ224	CHIP 1/16W 220K	1	
R215	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R216	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R217	ERJ6GMYJ683	CHIP 1/16W 68K	1	
R218	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R219	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R220	ERJ6GMYJ274	CHIP 1/16W 270K	1	
R222	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R223	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R224	ERJ6GMYJ561	CHIP 1/16W 560	1	
R225	ERJ6GMYJ222	CHIP 1/16W 2.2K	1	
R226	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R227	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R228	ERJ6GMYJ393	CHIP 1/16W 39K	1	
R229	ERJ6GMYJ221	CHIP 1/16W 220	1	
R230	ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R231	ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R232	ERJ6GMYJ563	CHIP 1/16W 56K	1	
R233	ERJ6GMYJ563	CHIP 1/16W 56K	1	
R234	ERJ6GMYJ472	CHIP 1/16W 4.7K	1	
R235	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R236	ERJ6GMYJ154	CHIP 1/16W 150K	1	
R237	ERJ6GMYJ154	CHIP 1/16W 150K	1	
R239	ERJ6GMYJ392	CHIP 1/16W 3.9K	1	
R240	ERJ6GMYG333	CHIP 1/16W 33K	1	
R241	ERJ6GMYJ684	CHIP 1/16W 680K	1	
R242	ERJ6GMYJ154	CHIP 1/16W 150K	1	
R243	ERJ6GMYJ683	CHIP 1/16W 68K	1	
R244	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R245	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R246	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R247	ERJ6GMYJ392	CHIP 1/16W 3.9K	1	
R248	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R249	ERJ6GMYG472	CHIP 1/16W 4.7K	1	

Ref.No.		Part No.	Part Name & Description			Pcs	Remarks
R250		ERJ6GMYJ821	CHIP	1/16W	820	1	
R251		ERJ6GMYJ824	CHIP	1/16W	820K	1	
R252		ERJ6GMYJ473	CHIP	1/16W	47K	1	
R253		ERDS2TJ684	CARBON	1/4W	680K	1	
R256		ERJ6GMYJ123	CHIP	1/16W	12K	1	
R257		ERJ6GMYJ562	CHIP	1/16W	5.6K	1	
R258		ERJ6GMYJ124	CHIP	1/16W	120K	1	
R258		ERJ6GMYJ683	CHIP	1/16W	68K	1	
R259		ERJ6GMYJ223	CHIP	1/16W	22K	1	
R260		ERJ6GMYJ223	CHIP	1/16W	22K	1	
R261		ERJ6GMYJ183	CHIP	1/16W	18K	1	
R262		ERDS2TJ682	CARBON	1/4W	6.8K	1	
R263		ERDS2TJ561	CARBON	1/4W	560	1	
R264		ERDS2TJ333	CARBON	1/4W	33K	1	
R265		ERDS2TJ103	CARBON	1/4W	10K	1	
R266		ERJ6GMYJ563	CHIP	1/16W	56K	1	
R267		ERJ6GMYJ563	CHIP	1/16W	56K	1	
R268		ERJ6GMYJ562	CHIP	1/16W	5.6K	1	
R269		ERJ6GMYJ272	CHIP	1/16W	2.7K	1	
R271		ERDS2TJ222	CARBON	1/4W	2.2K	1	
R272		ERDS2TJ154	CARBON	1/4W	150K	1	
R273		ERDS2TJ153	CARBON	1/4W	15K	1	
R274		ERDS2TJ154	CARBON	1/4W	150K	1	
R275		ERDS2TJ102	CARBON	1/4W	1K	1	
R276		ERDS2TJ273	CARBON	1/4W	27K	1	
R277		ERDS2TJ681	CARBON	1/4W	680	1	
R278		ERDS2TJ104	CARBON	1/4W	100K	1	
R279		ERDS2TJ683	CARBON	1/4W	68K	1	
R301		ERJ6GMYJ103	CHIP	1/16W	10K	1	
R302		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R303		ERJ6GMYJ152	CHIP	1/16W	1.5K	1	
R304		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R305		ERJ6GMYJ824	CHIP	1/16W	820K	1	
R306		ERJ6GMYJ151	CHIP	1/16W	150	1	
R307		ERJ6GMYJ222	CHIP	1/16W	2.2K	1	
R308		ERJ6GMYJ332	CHIP	1/16W	3.3K	1	
R309		ERJ6GMYJ684	CHIP	1/16W	680K	1	
R310		ERJ6GMYJ561	CHIP	1/16W	560	1	
R312		ERJ6GMYJ103	CHIP	1/16W	10K	1	
R313		ERJ6GMYJ393	CHIP	1/16W	39K	1	
R314		ERJ6GMYJ471	CHIP	1/16W	470	1	
R315		ERJ6GMYJ103	CHIP	1/16W	10K	1	
R316		ERJ6GMYJ471	CHIP	1/16W	470	1	
R317		ERJ6GMYJ471	CHIP	1/16W	470	1	
R318		ERJ6GMYJ471	CHIP	1/16W	470	1	
R319		ERJ6GMYJ182	CHIP	1/16W	1.8K	1	
R320		ERJ6GMYJ560	CHIP	1/16W	56	1	
R321		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R322		ERJ6GMYJ823	CHIP	1/16W	82K	1	
R323		ERJ6GMYJ333	CHIP	1/16W	33K	1	
R324		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R325		ERJ6GMYJ681	CHIP	1/16W	680	1	
R326		ERJ6GMYJ183	CHIP	1/16W	18K	1	
R327		ERJ6GMYJ123	CHIP	1/16W	12K	1	
R328		ERJ6GMYJ151	CHIP	1/16W	150	1	
R329		ERJ6GMYJ333	CHIP	1/16W	33K	1	
R350		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R351		ERJ6GMYJ823	CHIP	1/16W	82K	1	
R352		ERJ6GMYJ272	CHIP	1/16W	2.7K	1	
R707		ERJ6GEYJ103	CHIP	1/16W	10K	1	
R712		ERJ6GEYJ682	CHIP	1/16W	6.8K	1	
R713		ERJ6GEYJ681	CHIP	1/16W	680	1	
R714		ERD2FCG330	CARBON	2W	33	1	<!>
R715		ERJ6GEYJ271	CHIP	1/16W	270	1	
R716		ERJ6GEYJ272	CHIP	1/16W	2.7K	1	
R717		ERJ6GEYJ332	CHIP	1/16W	3.3K	1	
R718		ERJ6GEYJ754	CHIP	1/16W	750K	1	
R719		ERJ6GEYJ682	CHIP	1/16W	6.8K	1	
R720		ERJ6GEYJ822	CHIP	1/16W	8.2K	1	
R721		ERJ6GEYJ332	CHIP	1/16W	3.3K	1	
R722		ERJ6GEYJ392	CHIP	1/16W	3.9K	1	
R723		ERJ6GEYJ104	CHIP	1/16W	100K	1	
R724		ERJ6GEYJ101	CHIP	1/16W	100	1	
R725		ERJ6GEYJ182	CHIP	1/16W	1.8K	1	
R726		ERDS2TJ472	CARBON	1/4W	4.7K	1	

Ref.No.		Part No.	Part Name & Description			Pcs	Remarks
R727		ERJ6GEYJ471	CHIP	1/16W	470	1	
R728		ERDS2TJ471	CARBON	1/4W	470	1	
R729		ERJ6GEYJ331	CHIP	1/16W	330	1	
R730		ERJ6GEYJ331	CHIP	1/16W	330	1	
R737		ERJ6GEYJ394	CHIP	1/16W	390K	1	
R738		ERJ6GEYJ224	CHIP	1/16W	220K	1	
R739		ERDS2TJ681	CARBON	1/4W	680	1	
R740		ERJ6GEYJ473	CHIP	1/16W	47K	1	
R741		ERJ6GEYJ272	CHIP	1/16W	2.7K	1	
R742		ERJ6GEYJ272	CHIP	1/16W	2.7K	1	
R743		ERDS2TJ470	CARBON	1/4W	47	1	
R744		ERJ6GEYJ821	CHIP	1/16W	820	1	
R745		ERJ6GEYJ331	CHIP	1/16W	330	1	
R746		ERDS2TJ151	CARBON	1/4W	150	1	
R750		ERJ6GEYJ182	CHIP	1/16W	1.8K	1	
R757		ERJ6GEYJ222	CHIP	1/16W	2.2K	1	
R759		ERDS2TJ103	CARBON	1/4W	10K	1	
R760		ERJ6GEYJ102	CHIP	1/16W	1K	1	
R763		ERJ6GEYJ103	CHIP	1/16W	10K	1	
R764		ERJ6GEYJ822	CHIP	1/16W	8.2K	1	
R781		ERJ6GEYJ271	CHIP	1/16W	270	1	
R782		ERJ6GEYJ471	CHIP	1/16W	470	1	
R791		ERJ6GEYJ750	CHIP	1/16W	75	1	
R792		ERJ6GEYJ120	CHIP	1/16W	12	1	
R801		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R802		ERJ6GMYJ101	CHIP	1/16W	100	1	
R803		ERJ6GMYJ822	CHIP	1/16W	8.2K	1	
R804		ERJ6GMYJ562	CHIP	1/16W	5.6K	1	
R805		ERJ6GMYJ122	CHIP	1/16W	1.2K	1	
R806		ERJ6GMYJ271	CHIP	1/16W	270	1	
R807		ERJ6GMYJ272	CHIP	1/16W	2.7K	1	
R808		ERJ6GMYJ105	CHIP	1/16W	1M	1	
R809		ERJ6GMYJ103	CHIP	1/16W	10K	1	
R810		ERJ6GMYJ332	CHIP	1/16W	3.3K	1	
R811		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R812		ERJ6GMYJ471	CHIP	1/16W	470	1	
R813		ERJ6GMYJ104	CHIP	1/16W	100K	1	
R814		ERJ6GMYJ562	CHIP	1/16W	5.6K	1	
R815		ERJ6GMYJ562	CHIP	1/16W	5.6K	1	
R816		ERJ6GMYJ821	CHIP	1/16W	820	1	
R817		ERJ6GMYJ472	CHIP	1/16W	4.7K	1	
R818		ERJ6GMYJ273	CHIP	1/16W	27K	1	
R819		ERDS2TJ470	CARBON	1/4W	47	1	
R820		ERJ6GMYJ682	CHIP	1/16W	6.8K	1	
R821		ERJ6GMYJ822	CHIP	1/16W	8.2K	1	
R822		ERJ6GMYJ182	CHIP	1/16W	1.8K	1	
R823		ERJ6GMYJ152	CHIP	1/16W	1.5K	1	
R824		ERJ6GMYJ272	CHIP	1/16W	2.7K	1	
R825		ERJ6GMYJ562	CHIP	1/16W	5.6K	1	
R826		ERJ6GMYJ390	CHIP	1/16W	39	1	
R827		ERJ6GMYJ473	CHIP	1/16W	47K	1	
R828		ERJ6GMYJ472	CHIP	1/16W	4.7K	1	
R829		ERJ6GMYJ563	CHIP	1/16W	56K	1	
R830		ERJ6GMYJ563	CHIP	1/16W	56K	1	
R831		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R832		ERJ6GMYJ271	CHIP	1/16W	270	1	
R833		ERJ6GMYJ471	CHIP	1/16W	470	1	
R834		ERJ6GMYJ393	CHIP	1/16W	39K	1	
R835		ERJ6GMYJ473	CHIP	1/16W	47K	1	
R836		ERJ6GMYJ332	CHIP	1/16W	3.3K	1	
R2001		ERDS2TJ560	CARBON	1/4W	56	1	
R2002		ERDS2TJ560	CARBON	1/4W	56	1	
R2003		ERDS2TJ560	CARBON	1/4W	56	1	
R2004		ERX12SJ1R0	METAL OXIDE	1/2W	1	1	
R2005		ERJ6GMYJ102	CHIP	1/16W	1K	1	
R2006		ERJ6GMYC512	CHIP	1/16W	5.1K	1	
R2007		ERJ6GMYJ472	CHIP	1/16W	4.7K	1	
R2008		ERJ6GMYJ682	CHIP	1/16W	6.8K	1	
R2009		ERJ6GMYJ472	CHIP	1/16W	4.7K	1	
R2010		ERJ6GMYJ223	CHIP	1/16W	22K	1	
R2018		ERJ6GMYJ330	CHIP	1/16W	33	1	
R2029		ERJ6GMYJ683	CHIP	1/16W	68K	1	
R2030		ERJ6GMYJ333	CHIP	1/16W	33K	1	
R2031		ERJ6GMYJ473	CHIP	1/16W	47K	1	
R2032		ERJ6GMYJ124	CHIP	1/16W	120K	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
R2033	ERJ6GMYJ683	CHIP 1/16W 68K	1	
R2034	ERJ6GMYJ391	CHIP 1/16W 390	1	
R2710	ERDS2TJ472	CARBON 1/4W 4.7K	1	
R2711	ERDS2TJ105	CARBON 1/4W 1000K	1	
R2712	ERDS2TJ102	CARBON 1/4W 1K	1	
R2713	ERDS2TJ102	CARBON 1/4W 1K	1	
R2714	ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2715	ERDS2TJ222	CARBON 1/4W 2.2K	1	
R2716	ERDS2TJ223	CARBON 1/4W 22K	1	
R3001	ERDS2TJ471	CARBON 1/4W 470	1	
R3002	ERJ6GMYJ750	CHIP 1/16W 75	1	
R3004	ERJ6GMYJ750	CHIP 1/16W 75	1	
R3005	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R3006	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R3008	ERJ6GMYJ561	CHIP 1/16W 560	1	
R3009	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R3019	ERJ6GMYJ822	CHIP 1/16W 8.2K	1	
R3020	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R3021	ERJ6GMYJ222	CHIP 1/16W 2.2K	1	
R3022	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R3501	ERDS2TJ104	CARBON 1/4W 100K	1	NV-G20EN
R3502	ERDS2TJ561	CARBON 1/4W 560	1	
R3503	ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3504	ERDS2TJ152	CARBON 1/4W 1.5K	1	
R3505	ERDS2TJ392	CARBON 1/4W 3.9K	1	
R3506	ERDS2TJ102	CARBON 1/4W 1K	1	
R3507	ERDS2TJ750	CARBON 1/4W 75	1	
R3508	ERDS2TJ750	CARBON 1/4W 75	1	
R3509	ERDS2TJ333	CARBON 1/4W 33K	1	
R3510	ERDS2TJ183	CARBON 1/4W 18K	1	
R3511	ERDS2TJ750	CARBON 1/4W 75	1	
R4001	ERJ6GMYJ100	CHIP 1/16W 10	1	
R4003	ERJ6GMYJ472	CHIP 1/16W 4.7K	1	
R4004	ERJ6GMYJ563	CHIP 1/16W 56K	1	
R4005	ERJ6GMYJ132	CHIP 1/16W 1.3K	1	
R4006	ERJ6GMYJ123	CHIP 1/16W 12K	1	
R4008	ERJ6GMYJ562	CHIP 1/16W 5.6K	1	
R4009	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R4010	ERJ6GMYJ683	CHIP 1/16W 68K	1	
R4011	ERJ6GMYJ334	CHIP 1/16W 330K	1	
R4012	ERJ6GMYJ331	CHIP 1/16W 330	1	
R4013	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R4015	ERJ6GMYJ105	CHIP 1/16W 1M	1	
R4016	ERJ6GMYJ562	CHIP 1/16W 5.6K	1	
R4017	ERDS2TJ223	CARBON 1/4W 22K	1	
R4018	ERDS2TJ122	CARBON 1/4W 1.2K	1	
R4019	ERJ6GMYJ472	CHIP 1/16W 4.7K	1	
R4020	ERJ6GMYJ163	CHIP 1/16W 16K	1	
R4021	ERJ6GMYJ470	CHIP 1/16W 47	1	
R4022	ERJ6GMYJ123	CHIP 1/16W 12K	1	
R4023	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R4024	ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R4025	ERJ6GMYJ560	CHIP 1/16W 56	1	
R4027	ERJ6GMYJ511	CHIP 1/16W 510	1	
R4029	ERJ6GMYJ153	CHIP 1/16W 15K	1	
R6001	ERDS1TJ470	CARBON 1/2W 47	1	
R6006	ERD2FCG220	CARBON 2W 22	1	(!)
R6007	ERJ6GMYJ122	CHIP 1/16W 1.2K	1	
R6008	ERJ6GMYJ181	CHIP 1/16W 180	1	
R6009	ERJ6GMYJ561	CHIP 1/16W 560	1	
R6010	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R6011	ERJ6GMYJ221	CHIP 1/16W 220	1	
R6016	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R6017	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R6019	ERJ6GMYJ153	CHIP 1/16W 15K	1	
R6022	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R6023	ERJ6GMYJ683	CHIP 1/16W 68K	1	
R6024	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R6025	ERJ6GMYJ824	CHIP 1/16W 820K	1	
R6026	ERJ6GMYJ105	CHIP 1/16W 1M	1	
R6027	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R6028	ERJ6GMYJ184	CHIP 1/16W 180K	1	
R6029	ERJ6GMYJ561	CHIP 1/16W 560	1	
R6030	ERJ6GMYJ153	CHIP 1/16W 15K	1	
R6031	ERJ6GMYJ153	CHIP 1/16W 15K	1	

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
R6032	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R6033	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R6034	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R6035	ERJ6GMYJ101	CHIP 1/16W 100	1	
R6036	ERJ6GMYJ101	CHIP 1/16W 100	1	
R6037	ERJ6GMYJ101	CHIP 1/16W 100	1	
R6038	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R6041	ERJ6GMYJ391	CHIP 1/16W 390	1	
R6045	ERJ6GMYJ562	CHIP 1/16W 5.6K	1	
R6046	ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R6050	ERJ6GMYJ562	CHIP 1/16W 5.6K	1	
R6051	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R6068	ERDS2TJ332	CARBON 1/4W 3.3K	1	
R6069	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R6070	ERJ6GMYJ471	CHIP 1/16W 470	1	
R6071	ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R6072	ERJ6GMYJ562	CHIP 1/16W 5.6K	1	
R6073	ERJ6GMYJ391	CHIP 1/16W 390	1	
R6074	ERJ6GMYJ561	CHIP 1/16W 560	1	
R6075	ERG2SJ180	METAL OXIDE 2W 18	1	
R6079	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R6080	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R6081	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R6083	ERJ6GMYJ104	CHIP 1/16W 100K	1	
R6085	ERJ6GMYJ101	CHIP 1/16W 100	1	
R6087	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R6088	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R6089	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R6093	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R6094	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R6095	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R6096	ERJ6GMYJ272	CHIP 1/16W 2.7K	1	
R7518	ERJ6GMYJ181	CHIP 1/16W 180	1	
R7551	ERJ6GMYJ104	CHIP 1/16W 100K	1	
R7552	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R7554	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R7555	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R7556	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7557	ERJ6GMYJ124	CHIP 1/16W 120K	1	
R7558	ERJ6GMYJ104	CHIP 1/16W 100K	1	
R7559	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7560	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7561	ERJ6GMYJ223	CHIP 1/16W 22K	1	
R7562	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R7564	ERJ6GMYJ332	CHIP 1/16W 3.3K	1	
R7565	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R7568	ERJ6GMYJ103	CHIP 1/16W 10K	1	
R7572	ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7573	ERJ6GMYJ820	CHIP 1/16W 82	1	
R7574	ERJ6GMYJ333	CHIP 1/16W 33K	1	
R7575	ERJ6GMYJ273	CHIP 1/16W 27K	1	
R7576	ERDS2TJ390	CARBON 1/4W 39	1	
R7586	ERJ6GMYJ222	CHIP 1/16W 2.2K	1	
R7587	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R8001	ERJ6GMYJ102	CHIP 1/16W 1K	1	
R8002	ERJ6GMYJ221	CHIP 1/16W 220	1	
R8003	ERJ6GMYJ821	CHIP 1/16W 820	1	
		SWITCHES		
SW3501	VSS0152	SWITCH	1	
		TRANSFORMER		
T703	EIV5EC005A	TRANSFORMER	1	NV-G20EN/EA
T703	EIV5EC008A	TRANSFORMER	1	NV-G20A
T704	EIV5EC006A	TRANSFORMER	1	NV-G20EN/EA
T704	EIV5EC011A	TRANSFORMER	1	NV-G20A
T711	EIS5EC004A	TRANSFORMER	1	
T4001	EIQ70F001B	IF TRANSFORMER	1	
		VARIABLE RESISTORS		

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
VR301		EVND3AA00B22	VARIABLE 200	1	
VR701		EVNE4AA00B23	VARIABLE 2K	1	
VR702		EVNE4AA00B23	VARIABLE 2K	1	
VR741		EVN38CA00B14	VARIABLE 10K	1	
VR751		EVN38CA00B53	VARIABLE 5K	1	
VR801		EVND1AA00B52	VARIABLE 500	1	
VR2001		EVND3AA00B54	VARIABLE 50K	1	
VR2002		EVND3AA00B15	VARIABLE 100K	1	
VR2010		EVL51MA00B25	VARIABLE 200K	1	
VR2011		EVND3AA00B15	VARIABLE 100K	1	
VR2013		EVN38CA00B23	VARIABLE 2K	1	
VR3012		EVND3AA00B22	VARIABLE 200	1	
VR4001		EVND3AA00B14	VARIABLE 10K	1	
VR4002		EVND3AA00B25	VARIABLE 200K	1	
VR7502		EVND3AA00B14	VARIABLE 10K	1	
			CRYSTAL OSCILLATORS		
X201		VSX0066	CRYSTAL OSCILLATOR	1	
X710		EFCH38MSD1	FILTER	1	NV-G20EN/EA
X710		EFCH36MSP1	FILTER	1	NV-G20A
X711		EFCS5R5MW5	FILTER	1	
X712		EFCS5R5MS5	FILTER	1	
X801		VSX0129A	CRYSTAL OSCILLATOR	1	
X3501		VSX0099	CRYSTAL OSCILLATOR	1	
X6001		EFOFC3584A5	CRYSTAL OSCILLATOR	1	
			MISCELLANEOUS		
		VMC0075	HEAT SINK FIX SPRING	1	
		VMC1689	HEAT SINK	1	
		VSC1068	SHIELD CASE	1	
		VSC2030	SHIELD CASE	1	
		VJF0004	WIRE SADLE	1	
		VWJ0271	FLAT CABLE (8P)	1	P6004-P7501
		VWJ05DW200MM	FLAT CABLE (5P)	1	P1503-P6002
		VJH0414	RF & ANT. BOARD	1	NV-G20EN
		VJF0415	RF & ANT. BOARD	1	NV-G20A
		VJH0416	RF & ANT. BOARD	1	NV-G20EA
		VSC1789	SHIELD CASE (MAIN)	1	
		VSC1788	SHIELD CASE (TOP)	1	
		VSC1888	SHIELD CASE (BOTTOM)	1	
		TNV77803F2	TUNER	1	NV-G20EN/EA <!>
		TNV77804F2	TUNER	1	NV-G20A <!>
		VMP1040	DEMODU. SUPPORT ANGLE	1	
		VEJ0543	REAR JACK	1	NV-G20EN
		VEJ0544	REAR JACK	1	NV-G20A/EA
		VMZ0960	HEAT SINK BARRIER	1	
		VJF0215	BIND	2	
		VJF0330	PURSE LOCK	2	
	■	VEP05097E	HEAD AMP PACK C.B.A.		
			CAPACITORS		
C501		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C502		ECUX1H820JCN	CHIP 50V 82P	1	
C503		ECUX1H181KN	CHIP 50V 180P	1	
C504		ECUX1H330JCN	CHIP 50V 33P	1	
C505		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C506		ECUX1E473ZFN	CHIP 25V 0.047U	1	
C507		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C509		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C510		ECUX1E104ZF	CHIP 25V 0.1U	1	
C511		ECUX1E104ZF	CHIP 25V 0.1U	1	
C512		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C513		ECEA0JK220	ELECTROLYTIC 6.3V 22U	1	
C514		VCYD1C104MR1	SEMICONDUCTOR 16V 0.1U	1	
C515		ECUX1H102KBN	CHIP 50V 1000P	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C516		ECUX1H150JCN	CHIP 50V 15P	1	
C517		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C518		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C519		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C520		ECUX1H150JCN	CHIP 50V 15P	1	
C521		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C522		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C523		ECUX1H150JCN	CHIP 50V 15P	1	
C524		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C525		ECUX1H102KBN	CHIP 50V 1000P	1	
C527		ECUX1H102KBN	CHIP 50V 1000P	1	
C528		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C529		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C530		ECUX1E473ZFN	CHIP 25V 0.047U	1	
C531		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C533		ECUX1H560JCN	CHIP 50V 56P	1	
C534		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C537		ECUX1H150JCN	CHIP 50V 15P	1	
C538		ECEA1CK100	ELECTROLYTIC 16V 10U	1	
C539		ECUX1H103ZFN	CHIP 50V 0.01U	1	
			INTEGRATED CIRCUITS		
IC501		AN3224K	IC	1	<R>
IC502		AN3311S	IC	1	<R>
			COILS		
L501		VLQEL05F101K	COIL 100UH	1	
L502		VLQEL05F820K	COIL 82UH	1	
L503		VLQEL05F151K	COIL 150UH	1	
L505		VLQEL05F101K	COIL 100UH	1	
L507		VLQEL05F270K	COIL 27UH	1	
			CONNECTORS		
P002		VJS1927		1	
P501		VJP1248T	CONNECTOR(MALE) 8P	1	
P502		VJP1233T	CONNECTOR(MALE) 6P	1	
			TRANSISTORS		
Q501		2SB709	TRANSISTOR CHIP	1	<R>
			RESISTORS		
R501		ERJ6GMYJ561	CHIP 1/16W 560	1	
R502		ERJ6GMYJ102	CHIP 1/16W 1K	1	
R503		ERJ6GMYJ222	CHIP 1/16W 2.2K	1	
R504		ERJ6GMYJ331	CHIP 1/16W 330	1	
R505		ERJ6GMYJ223	CHIP 1/16W 22K	1	
R506		ERJ6GMYJ471	CHIP 1/16W 470	1	
R508		ERJ6GMYJ100	CHIP 1/16W 10	1	
R509		ERJ6GMYJ100	CHIP 1/16W 10	1	
R510		ERJ6GMYJ561	CHIP 1/16W 560	1	
R511		ERJ6GMYJ821	CHIP 1/16W 820	1	
R512		ERJ6GMYJ821	CHIP 1/16W 820	1	
R515		ERJ6GMYJ102	CHIP 1/16W 1K	1	
R516		ERJ6GMYJ152	CHIP 1/16W 1.5K	1	
R517		ERJ6GMYJ391	CHIP 1/16W 390	1	
R522		ERJ6GMYJ561	CHIP 1/16W 560	1	
R524		ERJ6GMYJ334	CHIP 1/16W 330K	1	
			VARIABLE RESISTORS		
VR501		EVND1AA00B23	VARIABLE 2K	1	
VR502		EVND1AA00B13	VARIABLE 1K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			MISCELLANEOUS		
		VSC1832	SHIELD CASE (TOP)	1	
		VSC1833	SHIELD CASE (MAIN)	1	
		VSC1834	SHIELD CASE (BOTTOM)	1	
	■	VEP06388A	OPERATION C.B.A.		
			CAPACITORS		
C6203		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6701		ECEA0JK470	ELECTROLYTIC 6.3V 47U	1	
C6702		ECKF1H102KB	CERAMIC 50V 1000P	1	
C6703		ECEA1HK010	ELECTROLYTIC 50V 1U	1	
C6704		ECEA1HK3R3	ELECTROLYTIC 50V 3.3U	1	
			DIODES		
D6201		LN81RCPHL	LED	1	
D6202		LN38GCPP	LED	1	
D6203		MA165	DIODE	1	
D6701		PN323B	DIODE	1	
			INTEGRATED CIRCUITS		
IC6701		UPC1490HA	IC	1	
			COILS		
L6201		VLQEL05F221K	COIL 220UH	1	
			CONNECTORS		
P6201		VJP1249T	CONNECTOR(MALE) 9P	1	
P6202		VJS1991		1	
			RESISTORS		
R6201		ERJ6GMYJ471	CHIP 1/16W 470	1	
R6202		ERJ6GMYJ181	CHIP 1/16W 180	1	
R6203		ERJ6GMYJ102	CHIP 1/16W 1K	1	
R6204		ERJ6GMYJ392	CHIP 1/16W 3.9K	1	
R6205		ERJ6GMYJ682	CHIP 1/16W 6.8K	1	
R6701		ERDS2TJ154	CARBON 1/4W 150K	1	
R6702		ERDS2TJ100	CARBON 1/4W 10	1	
			SWITCHES		
SW6201		EVQQS307K	SWITCH	1	<R>
SW6202		EVQQS307K	SWITCH	1	<R>
SW6203		ESD14314	SWITCH	1	<R>
			VARIABLE RESISTORS		
VR2007		EVUFSAE04B15	VARIABLE 100K	1	
VR2008		EVUFSAE04B15	VARIABLE 100K	1	
VR3004		EVUJ16E04B24	VARIABLE 20K	1	
VR6701		EVMLGGA00B15	VARIABLE 100K	1	
			MISCELLANEOUS		
		KL-04	LED SPACER	1	
		VGU3364	SLIDE SWITCH KNOB	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VMD0504	LED HOLDER	1	
		VSC1844	IR SHIELD CASE (MAIN)	1	
		VSC1928	IR SHIELD CASE (BOTTOM)	1	
		VSC1929	IR SHIELD BOARD	1	
	■	VEP07370A	TIMER C.B.A.		
			CAPACITORS		
C7501		ECUX1H080DC	CHIP 50V 8P	1	
C7502		ECRHA03E41	TRIMER 30P	1	
C7503		ECEA1HKR22	ELECTROLYTIC 50V 0.22U	1	
C7504		ECUX1H220JCN	CHIP 50V 22P	1	
C7505		ECUX1H330JCN	CHIP 50V 33P	1	
C7510		ECEA1HKS100	ELECTROLYTIC 50V 10U	1	
C7511		ECEA0JK221	ELECTROLYTIC 6.3V 220U	1	
C7512		ECUX1H103ZFN	CHIP 50V 0.01U	1	
C7514		ECUX1H103ZFN	CHIP 50V 0.01U	1	
			DIODES		
D7501		11ES1	DIODE	1	
D7502		MA4075	DIODE	1	
D7503		MA165	DIODE	1	
D7534		MA165	DIODE	1	
D7535		MA165	DIODE	1	
D7536		MA165	DIODE	1	
D7537		MA165	DIODE	1	
D7538		MA165	DIODE	1	
D7539		MA165	DIODE	1	
D7540		MA165	DIODE	1	
D7541		MA165	DIODE	1	
D7542		MA165	DIODE	1	
DP7501		VSL0101B	DISPLAY TUBE	1	
			INTEGRATED CIRCUITS		
IC7501		MN15283VEU	IC	1	
IC7502		MN1220	IC	1	<R>
IC7504		MN1280P	IC	1	
			CONNECTORS		
P7501		VJS1468	CONNECTOR(FEMALE)	1	
			TRANSISTORS		
Q7501		2SD637	TRANSISTOR	1	<R>
			COMBINATION PARTS		
			(TRANSISTOR & RESISTORS)		
QR7503		DTA124EA	TRANSISTOR RESISTOR	1	<R>
			RESISTORS		
R7501		ERJ6GMYJ122	CHIP 1/16W 1.2K	1	
R7502		ERJ6GMYJ224	CHIP 1/16W 220K	1	
R7503		ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7504		ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7507		ERJ6GMYJ104	CHIP 1/16W 100K	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
R7508		ERJ6GMYJ470	CHIP 1/16W 47	1	
R7509		ERJ6GMYJ102	CHIP 1/16W 1K	1	
R7510		ERJ6GMYJ223	CHIP 1/16W 22K	1	
R7511		ERJ6GMYJ473	CHIP 1/16W 47K	1	
R7527		ERJ6GMYJ103	CHIP 1/16W 10K	1	
R7528		ERJ6GMYJ103	CHIP 1/16W 10K	1	
R7529		ERJ6GMYJ103	CHIP 1/16W 10K	1	
R7535		ERJ6GMYJ102	CHIP 1/16W 1K	1	
			SWITCHES		
SW7501		EVQQS307K	SWITCH	1	<R>
SW7502		EVQQS307K	SWITCH	1	<R>
SW7503		EVQQS307K	SWITCH	1	<R>
SW7504		EVQQS307K	SWITCH	1	<R>
SW7505		EVQQS307K	SWITCH	1	<R>
SW7506		EVQQS307K	SWITCH	1	<R>
SW7507		EVQQS307K	SWITCH	1	<R>
SW7508		EVQQS307K	SWITCH	1	<R>
SW7509		EVQQS307K	SWITCH	1	<R>
SW7510		EVQQS307K	SWITCH	1	<R>
SW7511		EVQQS307K	SWITCH	1	<R>
SW7512		EVQQS307K	SWITCH	1	<R>
SW7513		EVQQS307K	SWITCH	1	<R>
SW7514		EVQQS307K	SWITCH	1	<R>
SW7515		EVQQS307K	SWITCH	1	<R>
SW7516		EVQQS307K	SWITCH	1	<R>
SW7517		EVQQS307K	SWITCH	1	<R>
SW7518		EVQQS307K	SWITCH	1	<R>
SW7519		EVQQS307K	SWITCH	1	<R>
SW7520		EVQQS307K	SWITCH	1	<R>
SW7521		EVQQS307K	SWITCH	1	<R>
SW7522		EVQQS307K	SWITCH	1	<R>
SW7523		EVQQS307K	SWITCH	1	<R>
SW7524		EVQQS307K	SWITCH	1	<R>
SW7525		EVQQS307K	SWITCH	1	<R>
SW7526		EVQQS307K	SWITCH	1	<R>
SW7527		EVQQS307K	SWITCH	1	<R>
			CRYSTAL OSCILLATORS		
X7501		VSX0140	CRYSTAL OSCILLATOR	1	
X7502		VSX0094A	CRYSTAL OSCILLATOR	1	
			MISCELLANIOUS		
		VJP0398	PIP HOLDER	1	
		VKC0280	HINGE	2	
	■	VEP01264B	POWER C.B.A.		NV-G20EN
		VEP01264C			NV-G20A
		VEP01264E			NV-G20EA
			CAPACITORS		
C1001		VCK0041	250V 330P	1	<!>
C1002		VCK0041	250V 330P	1	<!>
C1003		VCK0041	250V 330P	1	<!>
C1004		VCK0041	250V 330P	1	<!>
C1005		VCK0045	250V 1500P	1	<!>
C1006		VCK0045	250V 1500P	1	<!>
C1007		VCK0045	250V 1500P	1	<!>
C1008		VCK0045	250V 1500P	1	<!>
C1009		ECQU2A683MN	MYLAR 250V 0.068U	1	<!>
C1010		EC0S2GU101F	ELECTROLYTIC 400V 100U	1	
C1011		ECQE6473MZ	MYLAR 630V 0.047U	1	
C1012		ECEA1CGE470	ELECTROLYTIC 16V 47U	1	
C1018		ECEA1HGE470	ELECTROLYTIC 50V 47U	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
C1019		ECEA1EGE102	ELECTROLYTIC 25V 1000U	1	
C1020		ECEA1EGE102	ELECTROLYTIC 25V 1000U	1	
C1021		ECEA1CGE100	ELECTROLYTIC 16V 10U	1	
C1022		ECEA1HGE470	ELECTROLYTIC 50V 47U	1	
C1023		ECEA1AGE102	ELECTROLYTIC 10V 1000U	1	
C1024		ECEAOJFE102	ELECTROLYTIC 6.3V 1000U	1	
C1025		ECEA1HGE470	ELECTROLYTIC 50V 47U	1	
C1027		ECKD3D151KBN	CERAMIC 2KV 150P	1	
C1030		ECKF1H1032F	CERAMIC 50V 0.01U	1	
C1031		VCK0045	250V 1500P	1	<!>
C1032		VCK0045	250V 1500P	1	<!>
C1033		VCK0041	250V 330P	1	<!>
C1034		VCK0041	250V 330P	1	<!>
C1035		VCK0045	250V 1500P	1	<!>
C1036		VCK0045	250V 1500P	1	<!>
C1037		ECQU2A683MN	MYLAR 250V 0.068U	1	NV-G20EA <!>
C1038		VCK0045	250V 1500P	1	<!>
C1039		ECEA1CGE470	ELECTROLYTIC 16V 47U	1	
C1040		ECQP1101JZ	MYLAR 100V 100P	1	
C1041		ECKF1H1032F	CERAMIC 50V 0.01U	1	
C1042		ECKF1H103ZF	CERAMIC 50V 0.01U	1	
			DIODES		
D1001		S1WBA60	DIODE	1	<!>
D1002		ERA22-00	DIODE	1	
D1003		MA178	DIODE	1	
D1004		MA178	DIODE	1	
D1007		MA185	DIODE	1	
D1008		MA165	DIODE	1	
D1010		ERC30-02	DIODE	1	
D1012		MA4130L	ZENER	1	
D1013		MA185	DIODE	1	
D1015		ERA82-004	DIODE	1	
D1016		AK04V2	DIODE	1	
D1019		MA165	DIODE	1	
D1024		MA178	DIODE	1	
D1025		MA178	DIODE	1	
D1026		MA4082H	ZENER	1	
D1027		ERC30-02	DIODE	1	
D1029		ENB461D-05A	SURGE ABSORBER 460V	1	NV-G20EA <!>
D1030		MA4082	ZENER	1	
			FUSES		
F1001		XBA2C16TB0	250V 1.6A	1	<!>
F1002		XBA2C25TB0	250V 2.5A	1	<!>
			INTEGRATED CIRCUITS		
IC1001		STK5336	IC	1	
			COILS		
L1001		ELF18D290A		1	<!>
L1002		ELC07D220	FILTER	1	
			CONNECTOR		
P1001		VJS1952		1	
			TRANSISTORS		
Q1001		STR11006C	TRANSISTOR	1	NV-G20EN <!> <R>
Q1001		STR10006C	TRANSISTOR	1	NV-G20A/EA <!> <R>
Q1004		2SD638	TRANSISTOR	1	(Q,R,S) <R>
Q1011		2SB643	TRANSISTOR	1	(Q) <R>

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			RESISTORS		
R1002		ERF2AK2R2	WIRE WOUND 2W 2.2	1	<!>
R1003		ERDS2TJ224	CARBON 1/4W 220K	1	NV-G20EN
R1003		ERDS2TJ474	CARBON 1/4W 470K	1	NV-G20A/EA
R1004		ERDS2TJ224	CARBON 1/4W 220K	1	NV-G20EN
R1004		ERDS2TJ474	CARBON 1/4W 470K	1	NV-G20A/EA
R1005		ERDS2TJ224	CARBON 1/4W 220K	1	NV-G20EN
R1005		ERDS2TJ474	CARBON 1/4W 470K	1	NV-G20A/EA
R1006		ERDS2TJ224	CARBON 1/4W 220K	1	NV-G20EN
R1006		ERDS2TJ474	CARBON 1/4W 470K	1	NV-G20A/EA
R1007		ERG2ANJ683	METAL OXIDE 2W 68K	1	
R1008		ERW2PKR30	WIRE WOUND 2W 0.3	1	NV-G20EN
R1008		ERW2PKR39	WIRE WOUND 2W 0.39	1	NV-G20A/EA
R1012		ERQ12HJ6R8P	FUSE 1/2W 6.8	1	<!>
R1014		ERD2FCJ4R7	CARBON 2W 4.7	1	<!>
R1015		ERQ12HJ1R0P	FUSE 1/2W 1	1	<!>
R1016		ERQ12HJ6R8P	FUSE 1/2W 6.8	1	<!>
R1017		ERG12ANJ182	METAL OXIDE 1/2W 1800	1	
R1025		ERDS2TJ562	CARBON 1/4W 5.6K	1	
R1028		ERDS2TJ271	CARBON 1/4W 270	1	
			TRANSFORMER		
T1001		VLT0320	TRANSFORMER	1	NV-G20EN <!>
T1001		VLT0325	TRANSFORMER	1	NV-G20A/EA <!>
			MISCELLANEOUS		
		VSC1831	SHIELD PLATE	1	
		VJF0318	FUSE HOLDER	4	<!>
		VJS1972	INLET (MALE)	1	NV-G20EN <!>
		VJS1973	INLET (MALE)	1	NV-G20A/EA <!>
	■	VEP00H67B	SUB POWER C.B.A.		NV-G20EN
			CAPACITORS		
C1013		ECQV1H473JZ	MYLAR 50V 0.047U	1	
C1014		ECQV1H333JZ	MYLAR 50V 0.033U	1	
C1015		ECQM1682KZ	MYLAR 100V 6800P	1	
C1016		ECQM1472KZ	MYLAR 100V 4700P	1	
C1017		ECEB1EG100X	ELECTROLYTIC 25V 10U	1	
			DIODES		
D1005		MA178	DIODE	1	
D1006		MA178	DIODE	1	
			TRANSISTORS		
Q1002		2SD638	TRANSISTOR	1	<R>
			RESISTORS		
R1009		ERD25FAJ100	CARBON 1/4W 10	1	
R1010		ERG12SJ470	METAL OXIDE 1/2W 47	1	
R1011		ERDS2TJ222	CARBON 1/4W 2.2K	1	
	■	VEP00H48A	SUB POWER C.B.A.		NV-G20A/EA

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			CAPACITORS		
C1013		ECQB1H472KH	MYLAR 50V 4700P	1	
C1014		ECQV1H474JZ	MYLAR 50V 0.47U	1	
			DIODES		
D1005		MA178	DIODE	1	
			RESISTORS		
R1009		ERG1SJ181	METAL OXIDE 1W 180	1	
	■	VEP22063B	REMOTE CONTROL C.B.A.		
			CAPACITORS		
C1		ECKF1H471KB	CERAMIC 50V 470P	1	
C2		ECKF1H471KB	CERAMIC 50V 470P	1	
C3		ECEA0GKS101	ELECTROLYTIC 4V 100U	1	
			DIODES		
D1		SE303AY	DIODE	1	
			INTEGRATED CIRCUITS		
IC1		UPD6128C	IC	1	
			COMBINATION PARTS (TRANSISTOR & RESISTORS)		
QR1		UN1231	TRANSISTOR-RESISTOR	1	<R>
	■	ENC87901	RF CONVERTER & ANTENA		NV-G20EN/EA <!><R>
	■	ENC87902	BOOSTER UNIT		NV-G20A <!><R>
			INTEGRATED CIRCUIT		
IC1		LA7673P	IC	1	<R>
			TRANSISTOR		
Q31		2SC2570A	TRANSISTOR	1	<R>
			DIODES		
D1		MA4062	ZENER	1	<R>
D31		1SS110	DIODE	1	<R>
D32		1SS110	DIODE	1	<R>
D33		1SS110	DIODE	1	<R>
D34		1SS110	DIODE	1	<R>
			NOTE:		
			THE OTHER PARTS FOR		
			RF CONVERTER & ANTENA		
			BOOSTER UNIT ARE		
			NOT AVAILABLE AS SPARE		
			PARTS.		

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
	■	VEQ0188	RF CONVERTER & ANTENA		NV-G20EN/EA (!)<R>
	■	VEQ0489	BOOSTER UNIT		NV-G20A (!)<R>
			INTEGRATED CIRCUIT		
IC1		LA7673P	IC	1	<R>
			TRANSISTOR		
Q51		2SC2570A	TRANSISTOR	1	<R>
			DIODES		
D1		RD6.2EB	ZENER	1	<R>
D51		1S2076	DIODE	1	<R>
D52		HSK110	DIODE	1	<R>
D53		HSK110	DIODE	1	<R>
D54		HSK110	DIODE	1	<R>
			NOTE:		
			THE OTHER PARTS FOR		
			RF CONVERTER & ANTENA		
			BOOSTER UNIT ARE		
			NOT AVAILABLE AS SPARE		
			PARTS.		
	■	VEP00H22A	CYLINDER DRIVE C.B.A		
			CAPACITORS		
C2901		ECEA1VSN2R2	ELECTROLYTIC 35V 2.2U	1	
C2902		ECEA1VSN2R2	ELECTROLYTIC 35V 2.2U	1	
C2903		ECEA1VSN2R2	ELECTROLYTIC 35V 2.2U	1	
C2904		ECEA1HKSR22	ELECTROLYTIC 50V 22U	1	
C2905		ECEA1HKSR22	ELECTROLYTIC 50V 22U	1	
C2906		ECEA1HKSR22	ELECTROLYTIC 50V 22U	1	
C2907		ECEA1HKSR33	ELECTROLYTIC 50V 33U	1	
C2908		ECQV1H473	MYLAR 50V 0.047U	1	
C2909		ECQV1H104	MYLAR 50V 0.1U	1	
C2910		ECEA1CKS100	ELECTROLYTIC 16V 10U	1	
			INTEGRATED CIRCUIT		
IC2901		AN3812K	IC	1	
			RESISTOR		
R2901		ERX12ANJR68	METAL OXIDE 1/4W 0.68	1	
			CONNECTORS		
P2901		VJP1Z32		1	
P2902		VJP1927		1	
			MISCELLANEOUS		
		VSC1843	SINK HEAT	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
		VMA6884	MAIN HOLDER	1	
	■	VEP00H30A	MECHANISM CONNECTION C.B.A. CONNECTORS		
			CONNECTORS		
P1504		VJP1939	12P	1	
P1505		VJP1242T	2P	1	
			RESISTORS		
R1501		ERDS2TJ223	CARBON 1/4W 22K	1	
	■	VEP00H31A	REEL SENSOR C.B.A. PHOTO TRANSISTOR		
			INTEGRATED CIRCUITS		
IC1501		ON2170		1	
			CONNECTOR		
			CONNECTORS		
P1506		VJP1242	2P	1	
	■	VXA2689	LED C.B.A. UNIT		
			DIODES		
D1501		GL450	PHOTO DIODE	1	
			MISELLANEOUS		
		VMD0911	LED HOLDER	1	
		VWJ0254	FLEXISIBLE C.B	1	
	■	VEP00H34A	TAKEUP PHOTO Tr C.B.A.		
			CAPACITORS		
C1502		ECKW1H102KBN	CERAMIC 50V 1000P	1	
			RESISTORS		
R1503		ERDS2TJ222	CARBON 1/4W 2.2K	1	
			CONNECTORS		
P1503		VJS1936		1	
P1508		VJP1242T		1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks
			TRANSISTOR		
Q1502		PN150NV	PHOTO TRANSISTOR	1	
			MISCELLANEOUS		
		VMD0645	PHOTO TR HOLDER	1	
	■	VEP00H35A	SUPPLY PHOTO Tr C.B.A.		
			CAPACITOR		
C1501		ECKW1H102KBN	CERAMIC 50V 1000P	1	
			TRANSISTOR		
Q1501		PN150NV	PHOTO TRANSISTOR	1	
			MISCELLANEOUS		
		VMD0645	PHOTO TR HOLDER	1	

Ref.No.		Part No.	Part Name & Description	Pcs	Remarks

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